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Spin Parachute Removal Impact on ANSER Control Law Performance

Michael D. Messina
Lockheed Martin Engineering & Sciences Company
Hampton, Virginia

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National Aeronautics and
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Langley Research Center
Hampton, Virginia 23681-0001

Overview

The end of Phase III flight testing for the F/A-18 High Alpha Research Vehicle (HARV) calls for flow visualization flights to evaluate the flow field changes caused by nose stike deployment. The installation of a smoke generator system in the nose section will be used to accomplish these experiments. This modification to the F/A-18 HARV aircraft may require the removal of ballast located in the nose section. Ballast is used to balance the weight due to the spin parachute and thrust vectoring systems. To offset the ballast reduction, the removal of the spin parachute has been proposed. This report documents the control law performance information collected to assess the impact associated with the spin parachute removal and the resulting weight and balance changes. All time history results presented in this report were collected using the F/A-18 HARV batch simulation.

Spin Parachute Aerodynamic Effects

The F/A-18 HARV simulation (Reference 1) contains aerodynamic increments due to the spin parachute. Aerodynamic increments exist for lift, drag, pitching and yawing-moment increments, C_L , C_D , C_m , and C_n . For rolling moment and side force C_l and C_Y , the increments are equal to zero. The aerodynamic increments due to spin parachute were removed from the batch simulation aerodynamics model. Actuated Nose Strakes for Enhanced Rolling (ANSER) performance validation checkcases (Reference 2 and 3) were run to test the closed-loop dynamic changes that resulted. Figures 1 and 2 contain two examples of batch simulation runs with and without the spin parachute aerodynamic increments included. The parameters labeled NOCHT correspond to no-spin-parachute aerodynamic increments in the aerodynamic buildup equations. The parameters labeled BASE correspond to the current aircraft configuration, which includes the spin parachute. By referencing these plots it, can be determined that the impact of the spin parachute aerodynamics is small.

Weight, Center of Gravity (c.g.), and Inertia Effects

Updated values for the weight, c.g. locations, and inertia data listed in this section are taken from information received from

Dryden Flight Research Center. The design F/A-18 HARV weight, c.g. locations, and inertia values for a 60% fuel loading are as follows.

| | |
|------------------|----------------------------------|
| Weight | = 35764.6 lbs |
| FS _{cg} | = 456.21 inches |
| BL _{cg} | = 0.0 inches |
| WL _{cg} | = 105.39 inches |
| I _{xx} | = 22632.6 slugs-ft ² |
| I _{yy} | = 174246.3 slugs-ft ² |
| I _{zz} | = 189336.4 slugs-ft ² |
| I _{xz} | = -2131.8 slugs-ft ² |

where

| | |
|------------------|--|
| FS _{cg} | = Fuselage Station c.g. |
| BL _{cg} | = Buttock Line c.g. |
| WL _{cg} | = Water Line c.g. |
| I _{xx} | = roll moment of inertia |
| I _{yy} | = pitch moment of inertia |
| I _{zz} | = yaw moment of inertia |
| I _{xz} | = roll-yaw cross coupling product of inertia |

The design F/A-18 HARV weight and balance values were used for all ANSER control law development including linear and non-linear analysis, real-time piloted simulation, handling qualities evaluations, performance versus design guidelines, and Pilot Induced Oscillation (PIO) assessments.

The ANSER control law design (Reference 4) was finalized with the design 60% fuel loading shown above. The empty weight of the F/A-18 HARV aircraft changed with the incorporation of the new nose cone, which contained the nose strakes and associated hardware. The F/A-18 HARV empty weight was updated to account for the weight and inertia of individual fuel tanks. The original simulation model did not model the aircraft fuel-burn curves and used fixed values for the aircraft inertias. The new model only makes this assumption for the I_{xz} value since data didn't exist from McDonnell Douglas Aircraft. Therefore, adjusting the empty weight and inertias resulted in a new 60% fuel loading which is shown below.

Weight = 36758.2 lbs

| | |
|-----------|----------------------------------|
| FS_{cg} | = 455.64 inches |
| BL_{cg} | = -0.15 inches |
| WL_{cg} | = 103.34 inches |
| I_{xx} | = 23497.0 slugs-ft ² |
| I_{yy} | = 181630.7 slugs-ft ² |
| I_{zz} | = 196669.8 slugs-ft ² |
| I_{xz} | = -1741.9 slugs-ft ² |

This weight and balance configuration is recommended for performing any new F/A-18 HARV simulation studies and corresponds to the aircraft configuration tested to date for Phase III flight tests.

The proposed aircraft changes discussed in the introduction for flow visualization flights would cause changes to the previous empty weight and balance information. With the removal of the spin parachute and nose cone ballast, a weight reduction of 1510.7 lbs would occur. That weight reduction would change the inertia values as well. The 60% fuel loading values of the F/A-18 HARV without the spin parachute are as follows.

| | |
|-----------|----------------------------------|
| Weight | = 35247.5 lbs |
| FS_{cg} | = 455.32 inches |
| BL_{cg} | = -0.15 inches |
| WL_{cg} | = 103.38 inches |
| I_{xx} | = 23421.6 slugs-ft ² |
| I_{yy} | = 159224.5 slugs-ft ² |
| I_{zz} | = 174339.6 slugs-ft ² |
| I_{xz} | = -2493.0 slugs-ft ² |

A significant reduction in the pitch and yaw moment of inertia can be noted between the aircraft configurations with and without the spin parachute.

Effects on Aircraft Performance

Figures 3 and 4 present the same batch time histories as those in Figures 1 and 2 with the weight, c.g., and inertia values updated to the 60% fuel loading without the spin parachute. The parameters labeled NOCHT now correspond to the 60% fuel loading without the

spin parachute and without the spin parachute aerodynamic contributions. More noticeable differences in the time histories shown in Figures 3 and 4 can be observed. The lateral/directional axes closed loop dynamics appear more affected than the longitudinal axis dynamics.

One contributing factor to the changes in lateral/directional dynamics is that the Pseudo Controls portion of the lateral/directional control laws contain the original 60% design inertias. Pseudo Controls computes roll and yaw commands based on these values. Inertia reductions due to the spin parachute removal will result in the same roll and yaw commands from Pseudo Controls before other control system feedbacks are added. Since the aircraft inertias are lower, the roll and yaw commands will be higher than needed to produce the same aircraft dynamics. To achieve aircraft dynamics closer to the design configuration without the spin parachute, the inertia values loaded in Pseudo Controls would need to be changed.

Since the lateral/directional axes showed a greater impact on accelerations and rates due to the proposed aircraft modifications, additional analysis was performed to examine the ANSER control law performance during 360° rolls. Batch simulation runs were performed at 5°, 30°, and 50° Angle of Attack (AOA) trim conditions. The altitude was 25,000 feet with the ANSER control laws in Strake-Thrust-Vectoring (STV) mode. Those runs are shown on Figures 5, 6, and 7. Again significant changes in the closed-loop dynamics can be observed. Differences in trim stabilator position are apparent in those time history comparisons. Since trims have been noticeably changed, linear analysis was used to evaluate the impact on stability margins.

Linear Models

To support linear analysis, new linear models were created using the F/A-18 HARV Advanced Continuous Simulation Language (ACSL) batch simulation. New trims and linear models were generated at 5°, 20°, 40°, and 50° AOA at 25,000 feet. The linear models are presented in Table 1. Acceptable stability margins were found to exist for the longitudinal control laws. The lateral/directional analysis showed satisfactory stability margins for the 5°, 20°, and 50° AOA linear models. At 40° AOA, some loss in margin and damping was found. Additional linear models were

generated at 39° and 41° AOA to test the aerodynamics database around 40° AOA. At 40° AOA, the F/A-18 low and high aerodynamic models are blended together and have some abrupt changes between aerodynamic tables. The linear models at 39° and 41° AOA are listed in Table 2 and have been reduced to lateral/directional parameters only. Substantial improvements in margins were found with these linear models versus the 40° AOA model.

The range of aircraft loading between heavy and light weight was also analyzed. Using flight data, the estimated weight, c.g. locations, and inertias after the F/A-18 HARV had refueled in flight was obtained. Likewise, that same data were extracted before the F/A-18 HARV landed after a research flight. Differences between the heavy and light weight aircraft loadings and the new 60% fuel loading were computed and then added to the design 60% fuel loading without the spin parachute. These calculations represent an estimate for the heavy and light weight aircraft loadings without the spin parachute. The data that results is as follows:

| | <u>HEAVY</u> | <u>LIGHT</u> |
|--|--------------|--------------|
| Weight (lbs) | 38290 | 30240 |
| FScg (inches) | 53.7 | 460.4 |
| BL _{cg} (inches) | -0.15 | -0.2 |
| WL _{cg} (inches) | 104.5 | 102.3 |
| I _{xx} (slugs-ft ²) | 24725 | 22175 |
| I _{yy} (slugs-ft ²) | 161394 | 151994 |
| I _{zz} (slugs-ft ²) | 177670 | 166870 |
| I _{xz} (slugs-ft ²) | -2951 | -2121 |

Additional linear models were created using the heavy and light loadings shown above at 40° AOA and are included in Table 2. These linear models resulted in improved stability margins, but still did not meet the design goals at low frequencies. Low margins at low frequencies had been seen in some linear models with the original 60% fuel configuration. Since acceptable flight tests results were achieved with this configuration, satisfactory results without the spin parachute should result.

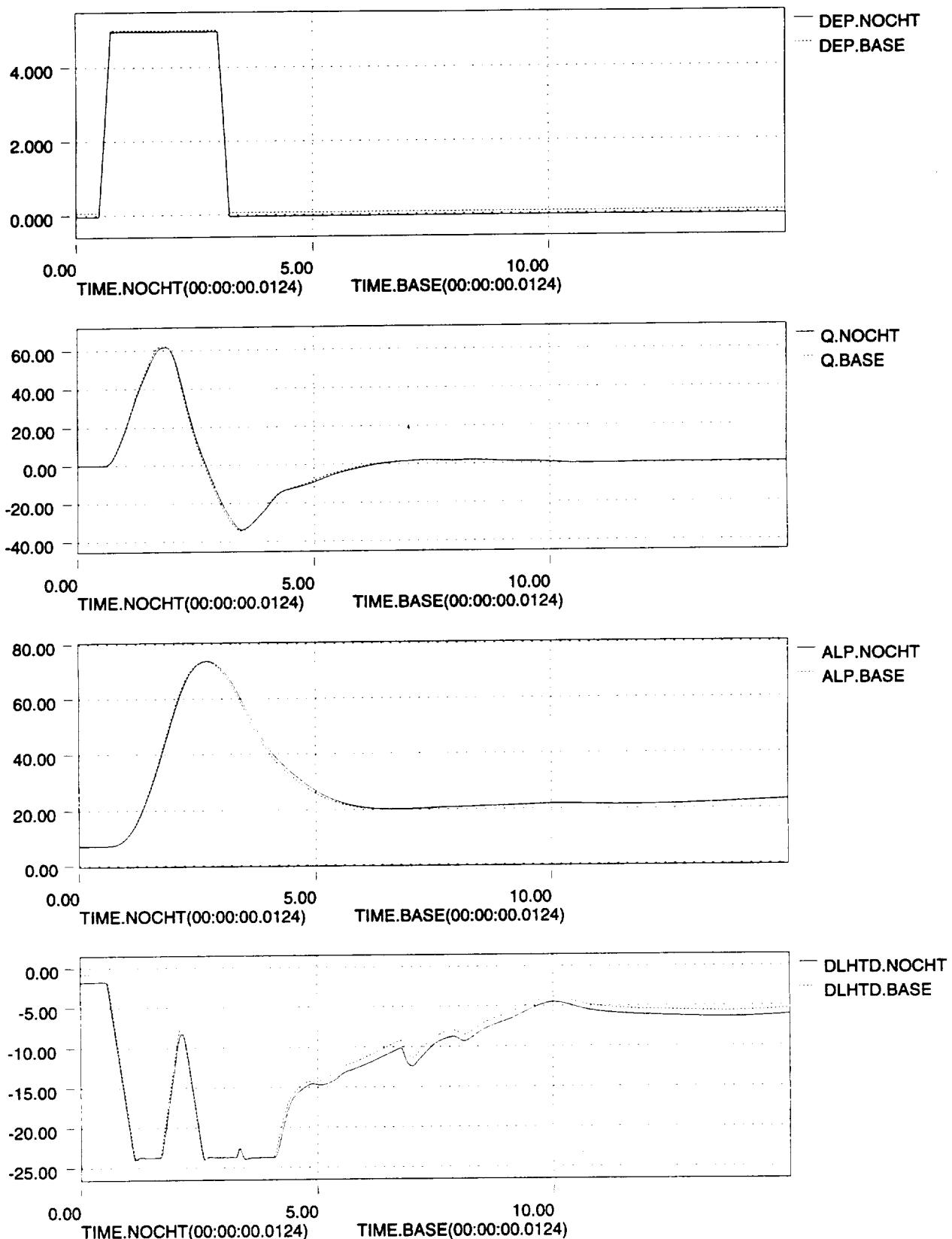
Summary and Conclusions

The batch simulation model was updated to reflect new weight, c.g. locations, and inertia data. Also, a spin parachute-off model was developed to investigate the spin parachute impact on the aircraft aerodynamics. Significant differences in closed-loop dynamics were shown to exist when the batch simulation is updated to reflect these proposed changes. The differences were primarily caused by the aircraft changes in inertia; aerodynamics effects were shown to be very small. The results presented in this report were used to address the performance of the ANSER control laws. The closed-loop dynamic results shown were significant but did not show any stability and control problems with the spin parachute removal. The ANSER control law performance without the spin parachute does not need to be changed for flight testing. From batch simulation results, the ANSER control law performance looks satisfactory to accomplish the flow-visualization flight tests.

References

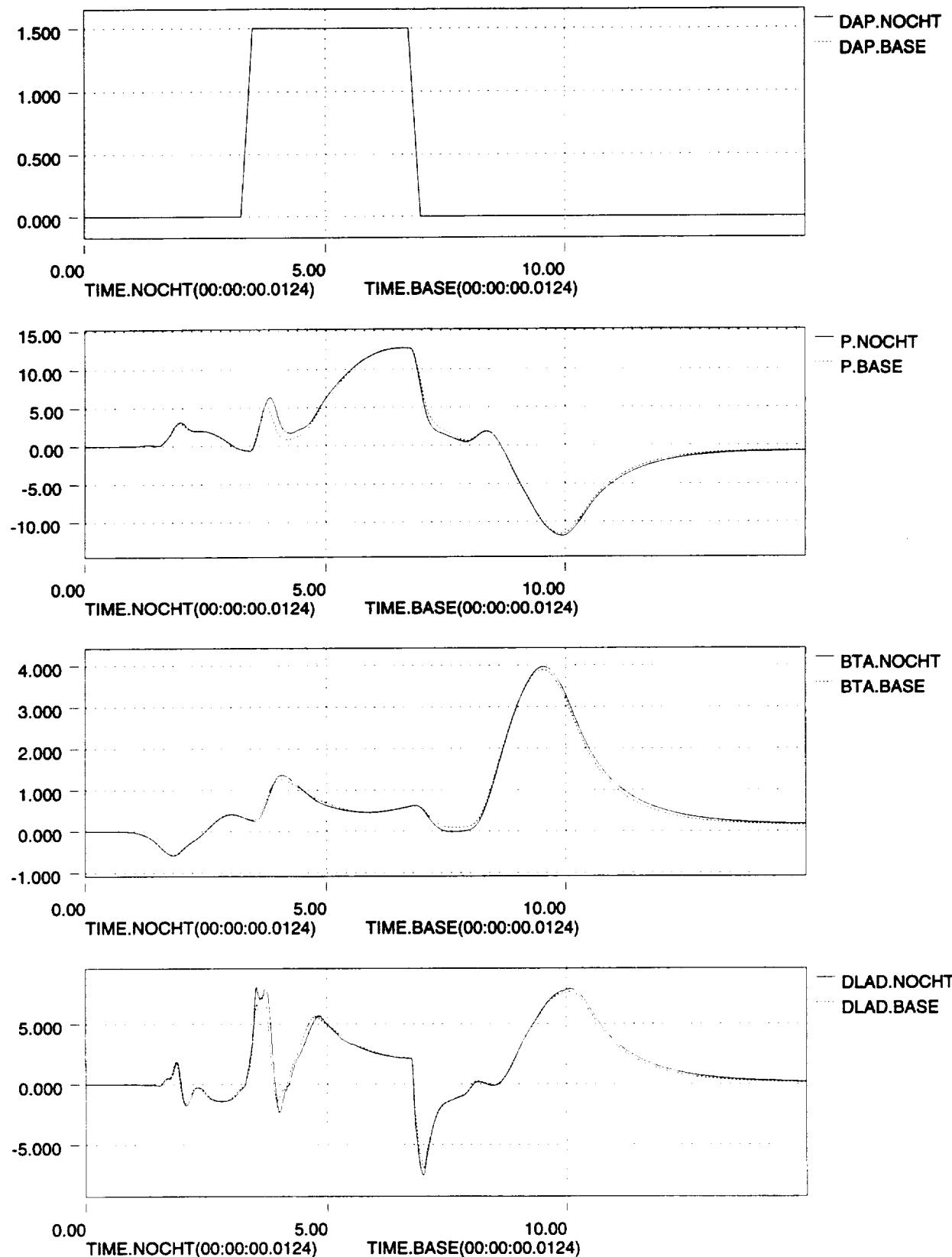
1. Messina, M. D.; Strickland, M. E.; Hoffler, K. D.; Carzoo, S. W.; Bundick, W. T.; Yeager, J. C.; Beissner, F. L.: *Simulation Model of the F/A-18 High Angle of Attack Research Vehicle Utilized for the Design of Advanced Control Laws*. NASA TM-110216, 1996.
2. Messina, M. D.: *Performance Validation of the ANSER Control Laws for the F-18 HARV*, NASA Contractor Report 198196, August 1995.
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4. Bacon, B. J.; Davidson, J. B.; Hoffler, K. D.; Lallman, F. J.; Messina, M. D.; Murphy, P. C.; Ostroff, A. J.; Proffitt, M. S.; Strickland, M. E.; Yeager, J. C.; Foster, J. V.; Bundick, W. T.: *Design Specification for a Thrust-Vectoring, Actuated-Nose-Strake Flight Control Law for the High-Alpha Research Vehicle*, NASA TM-110217, 1996.

Figure 1 - Spin Parachute Aerodynamics Removed versus Baseline
CASE_30_S_Mode_.68-40k_trim--3_axis_input page 1/12



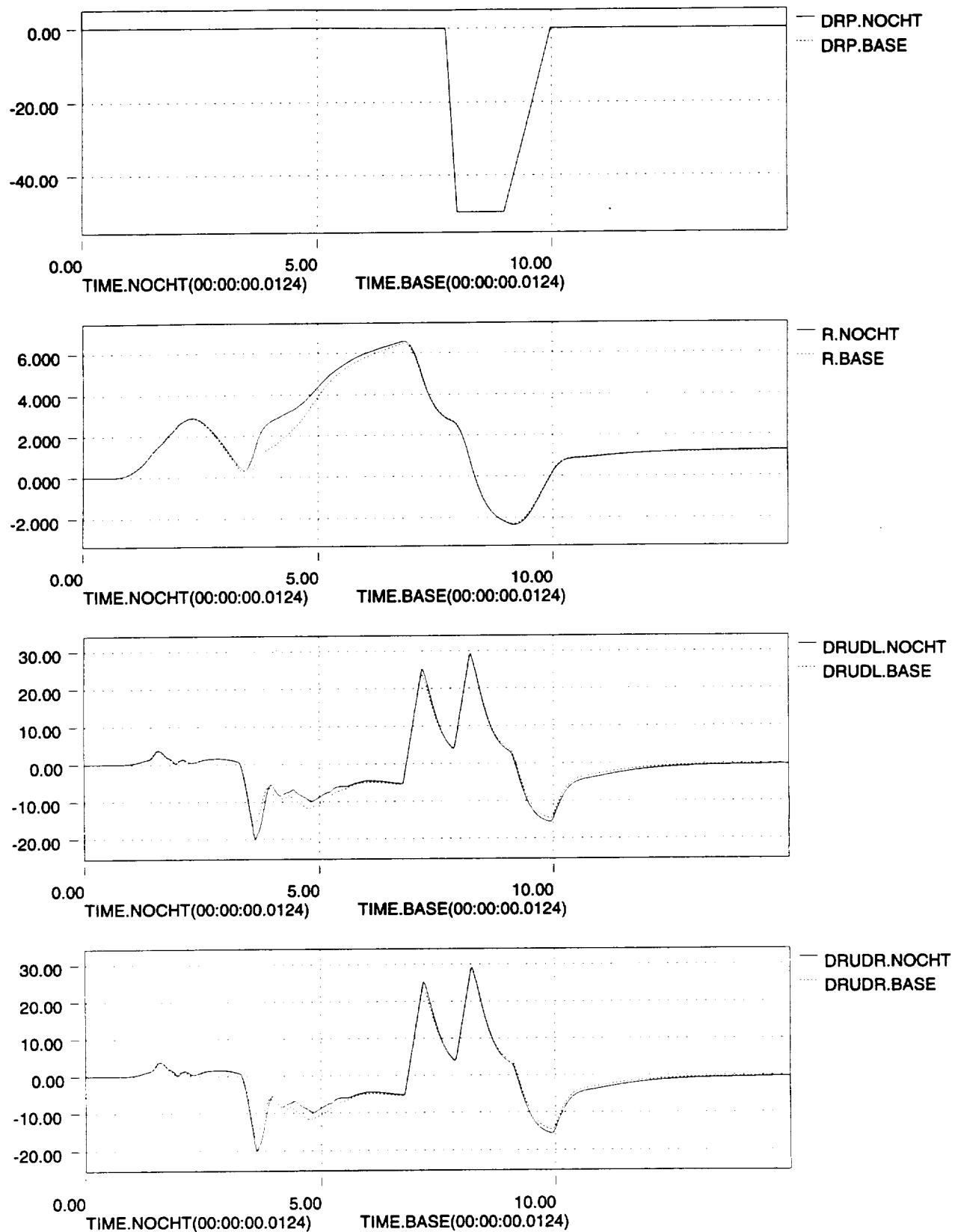
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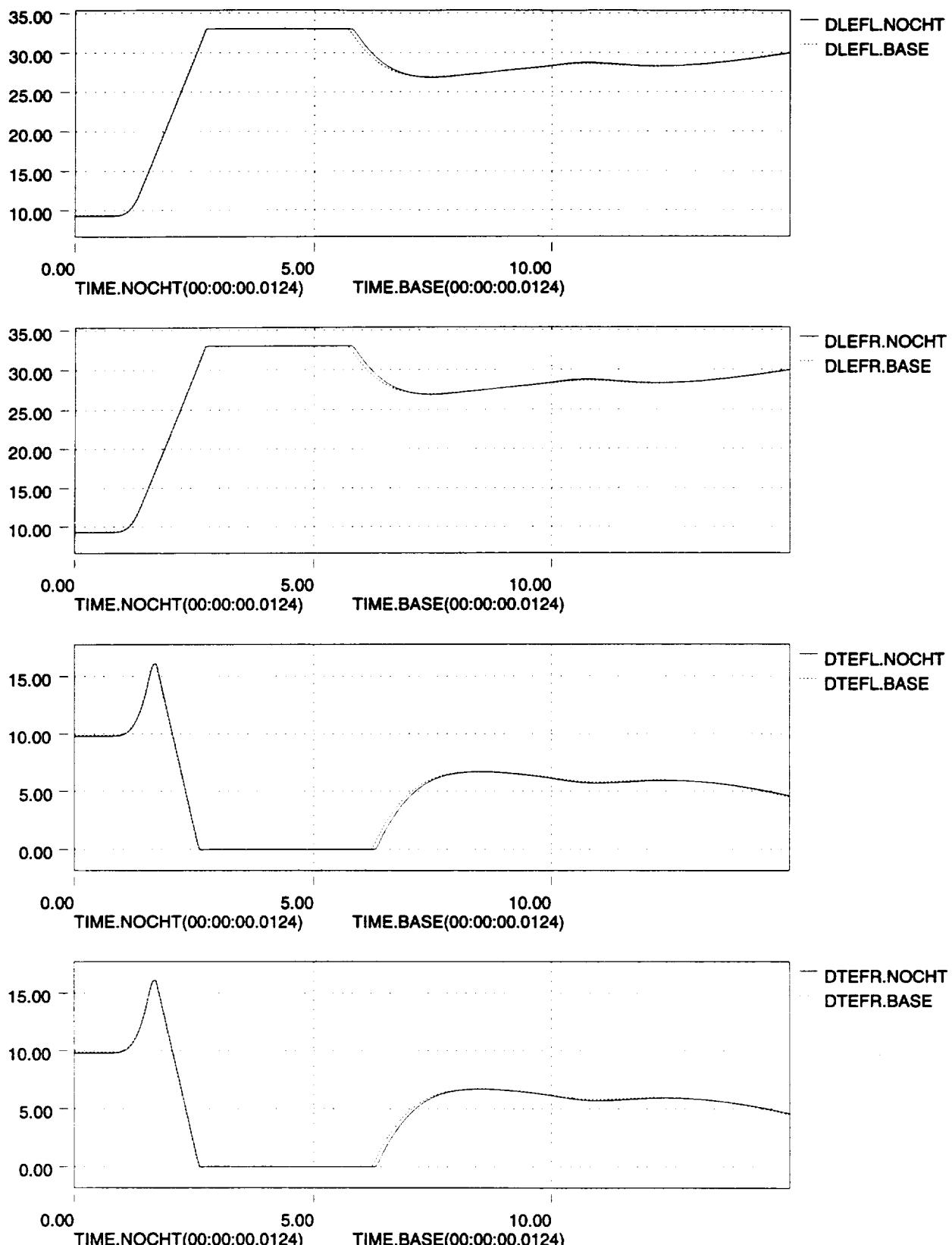
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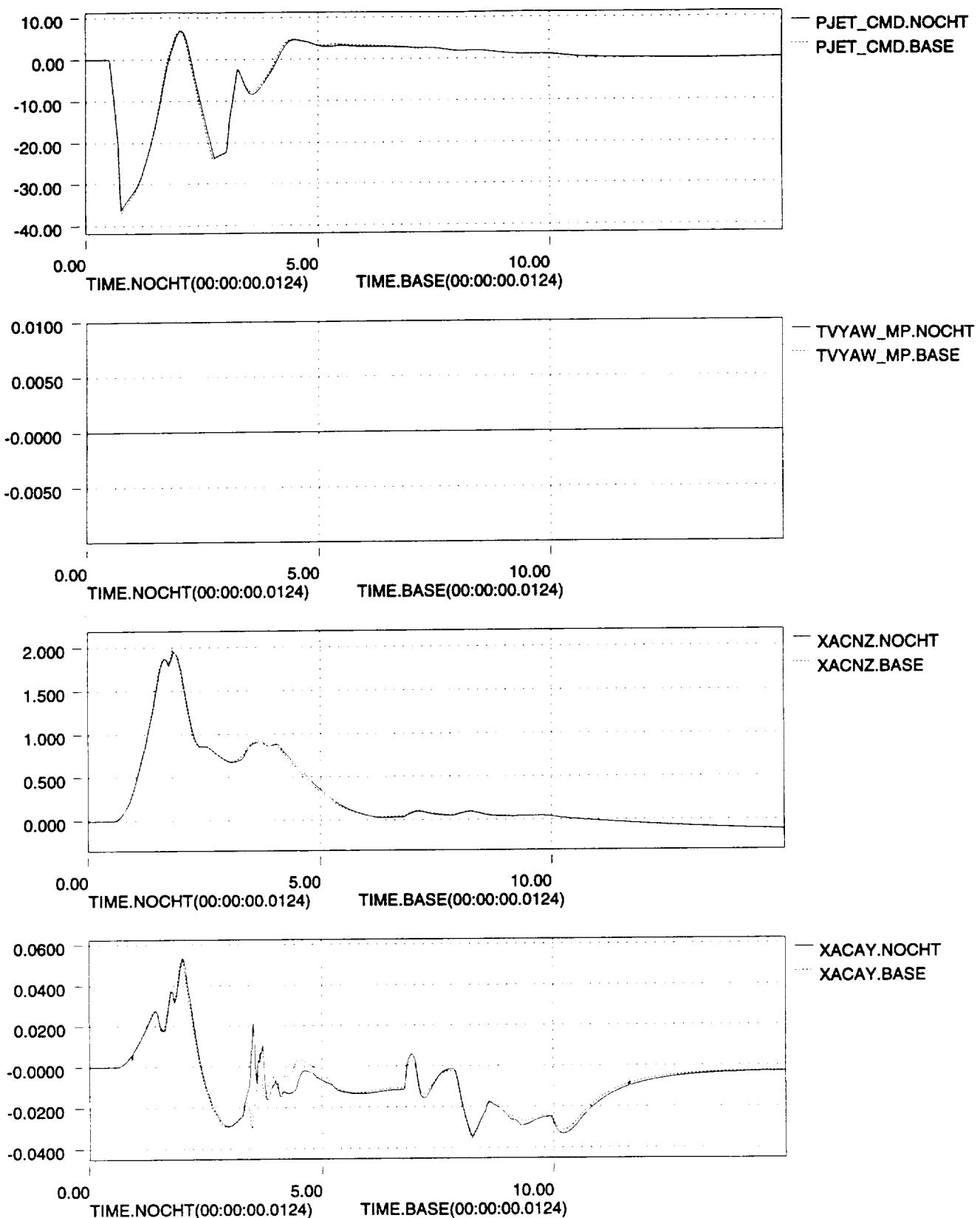
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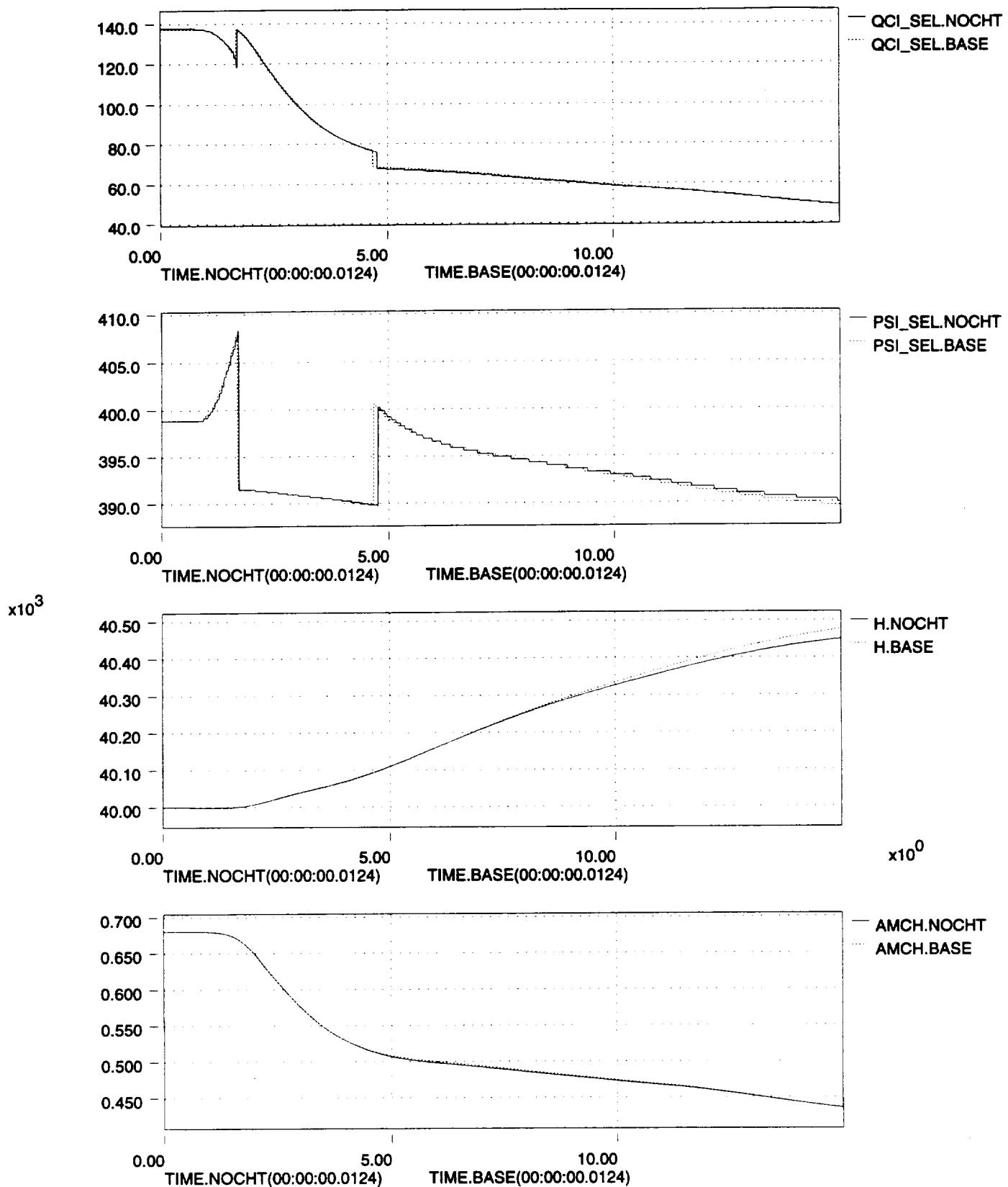
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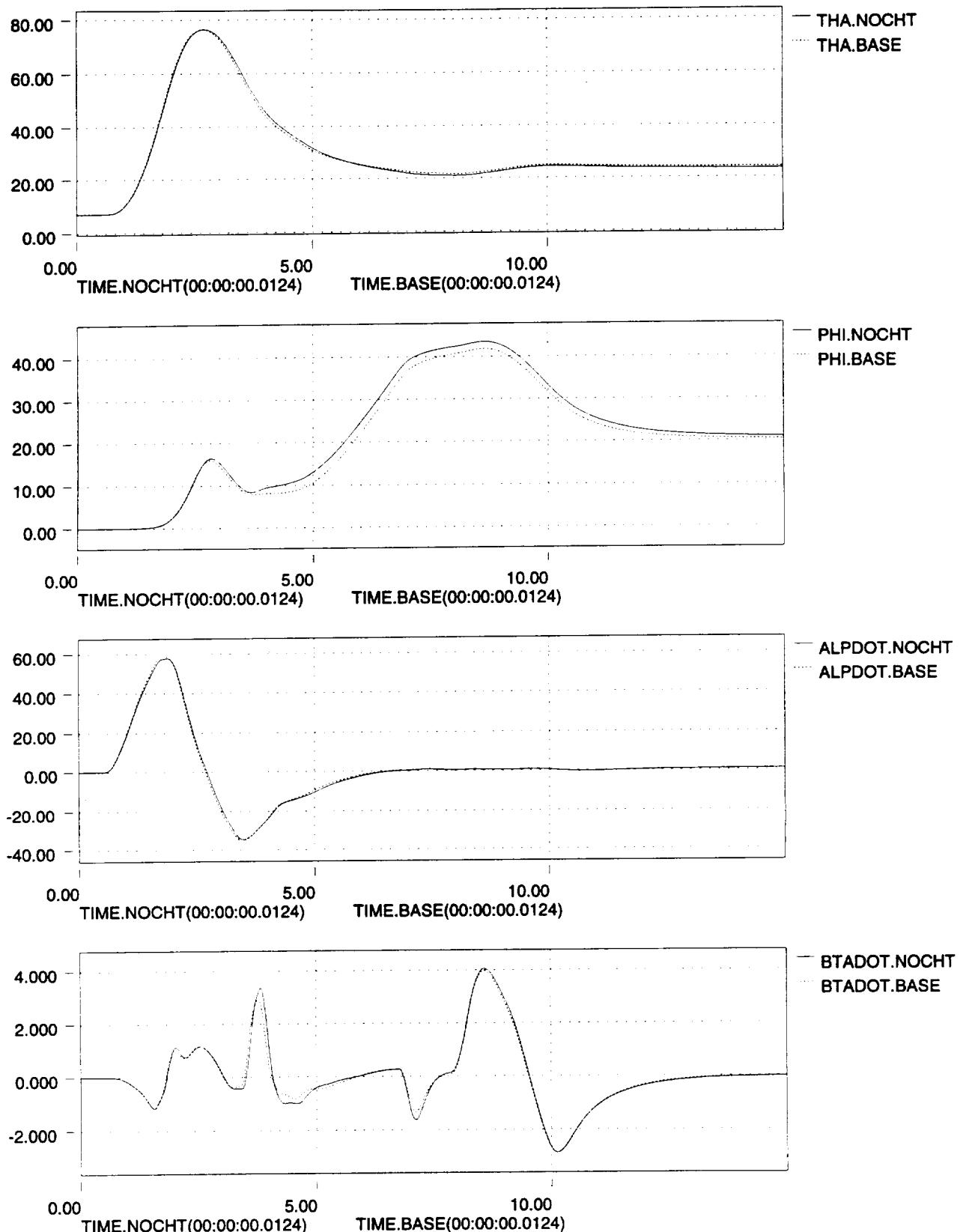
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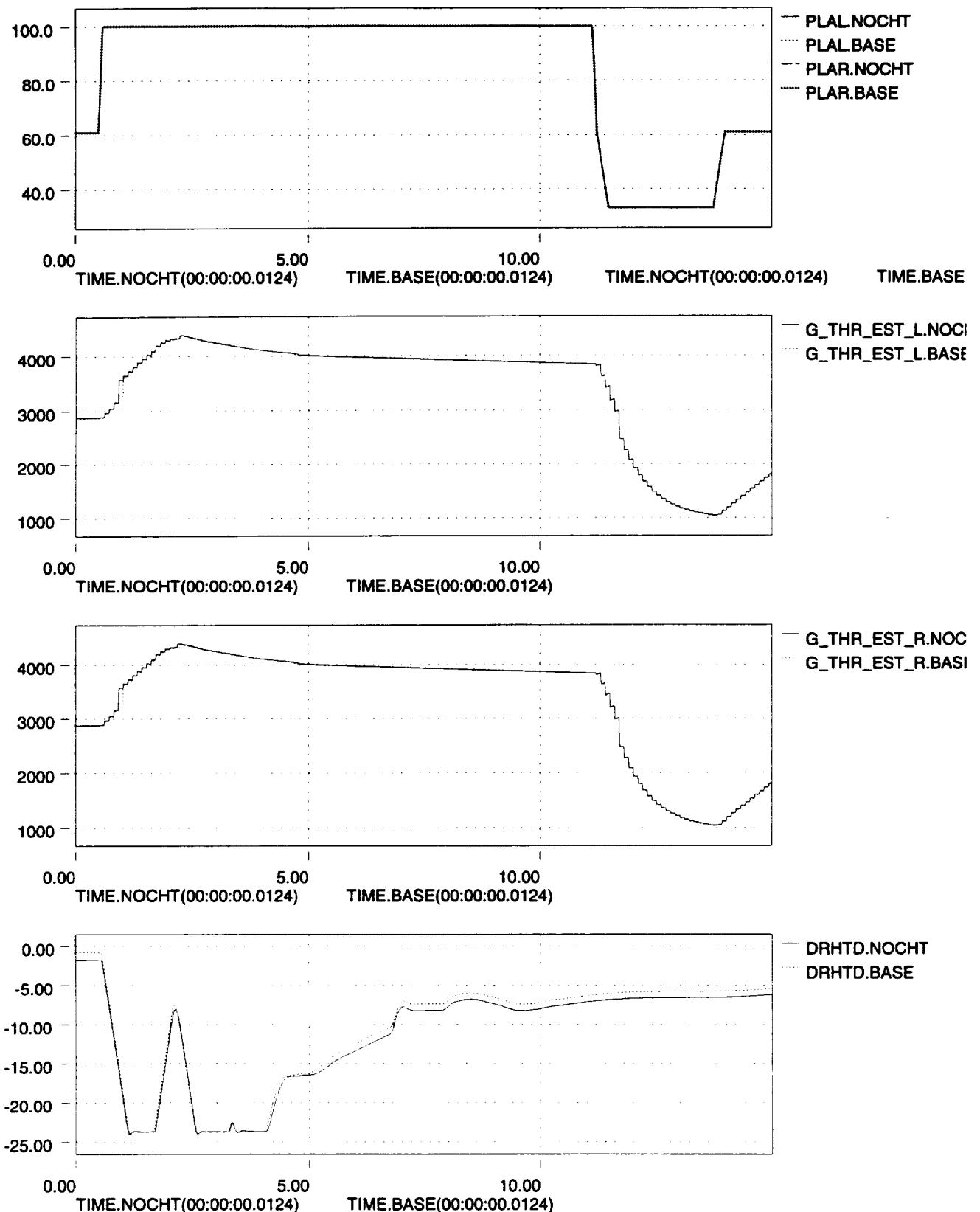
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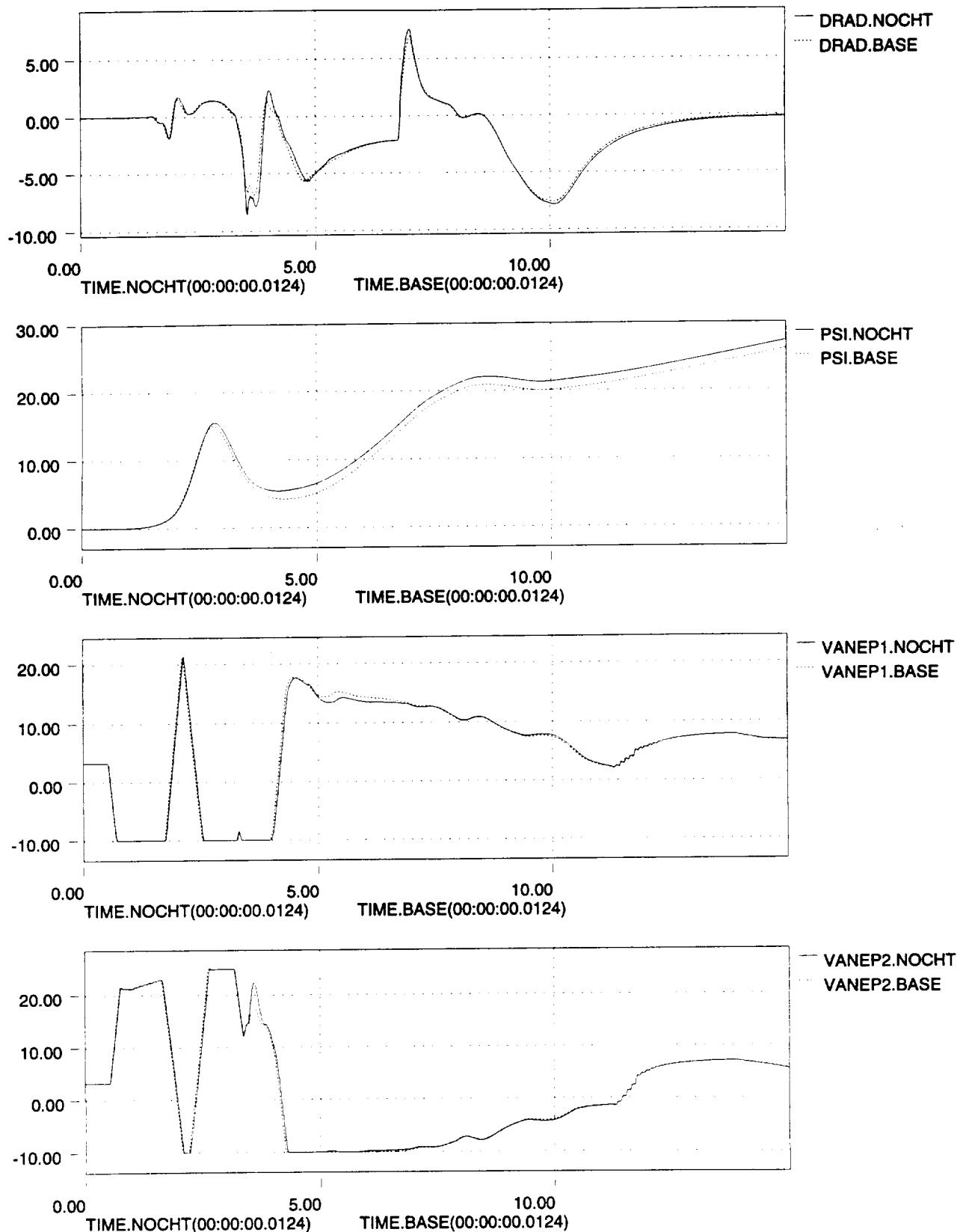
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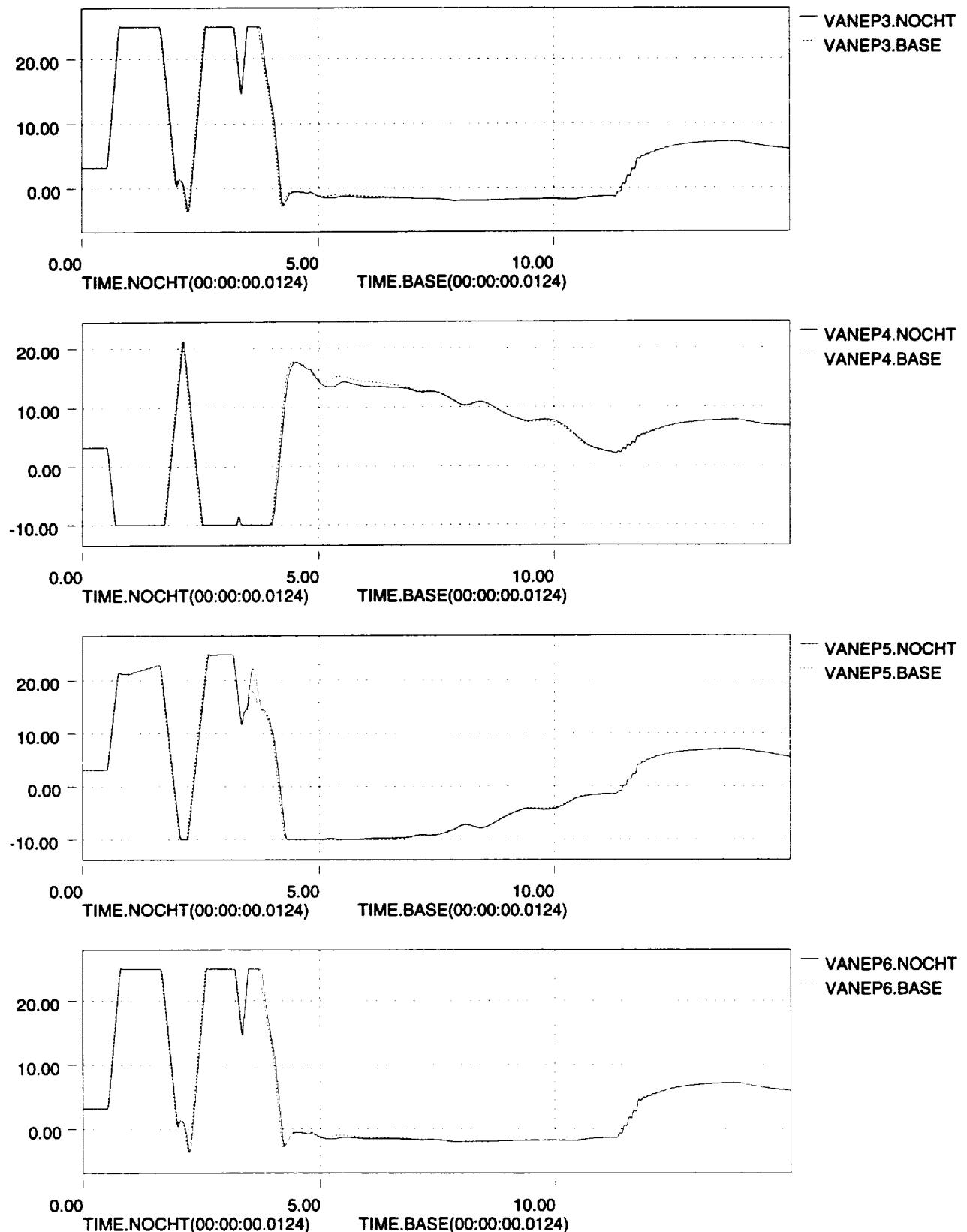
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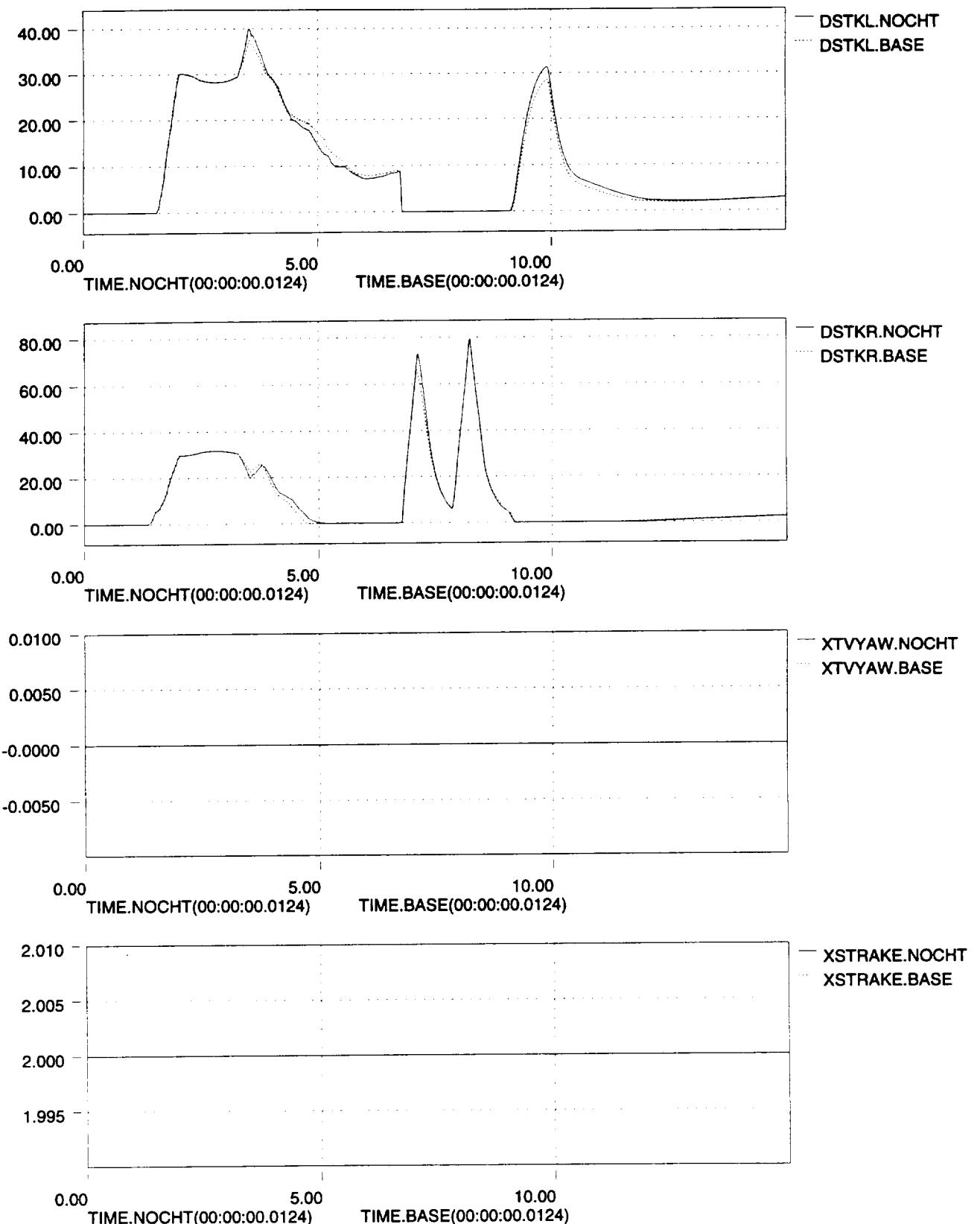
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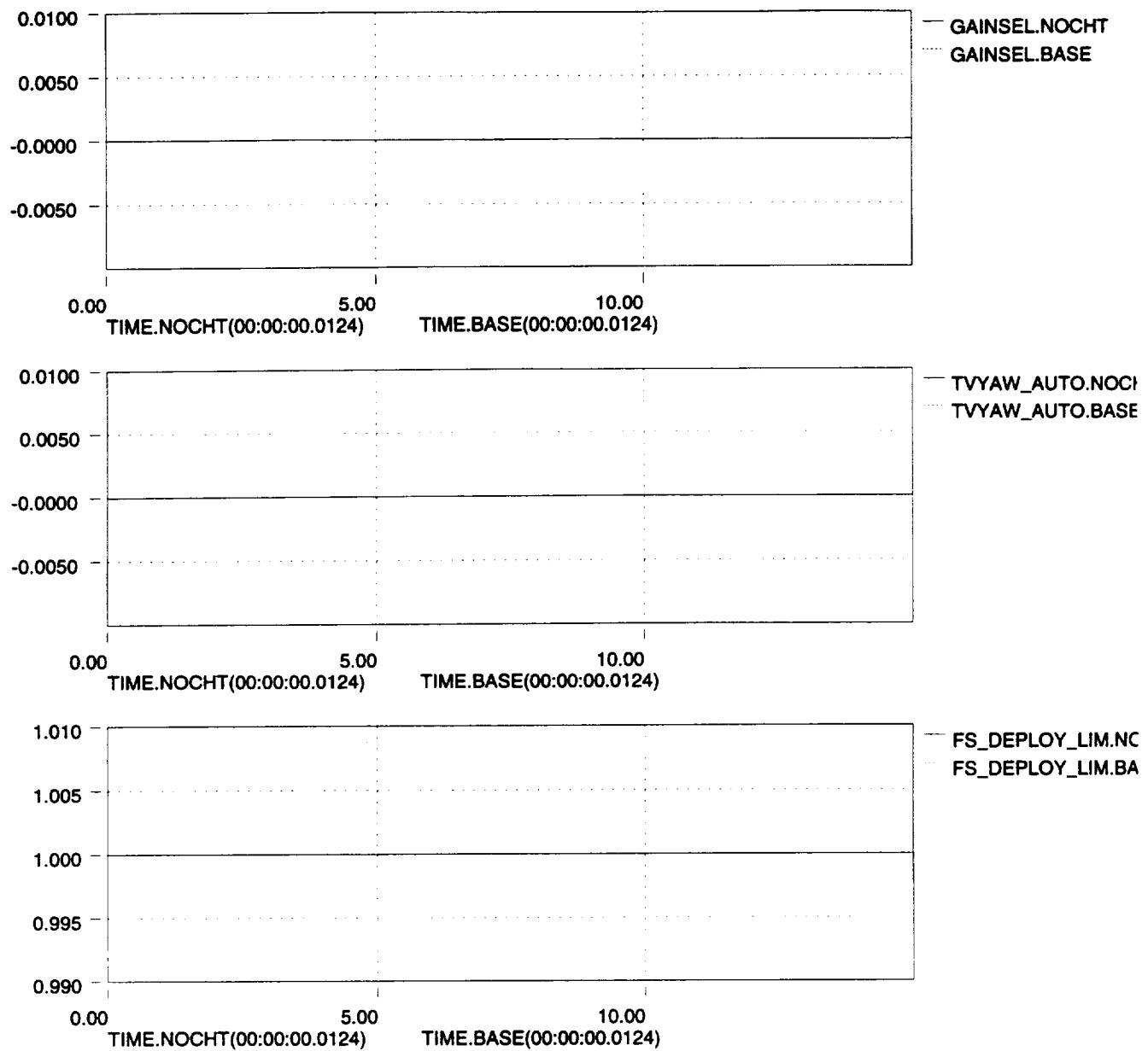
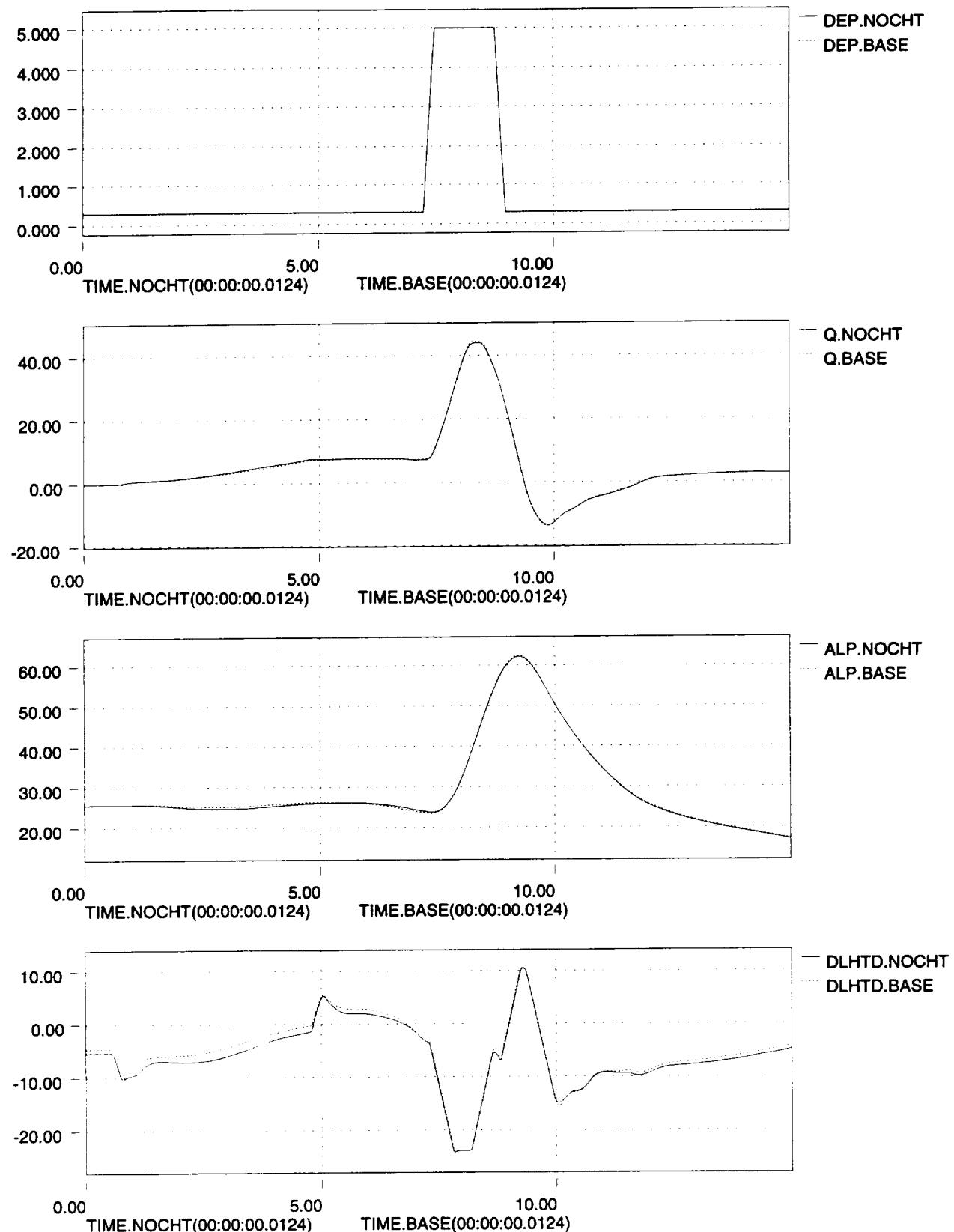
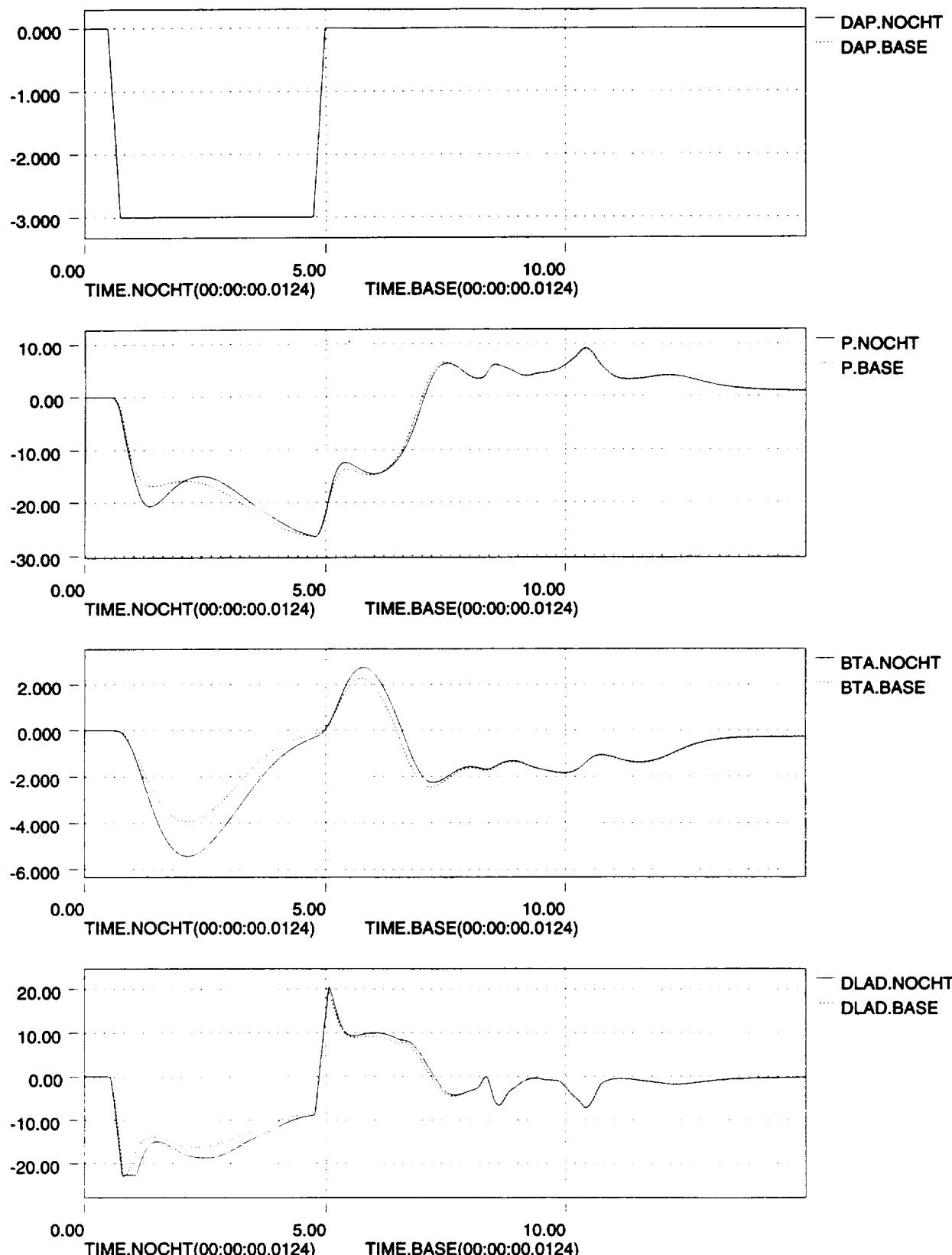


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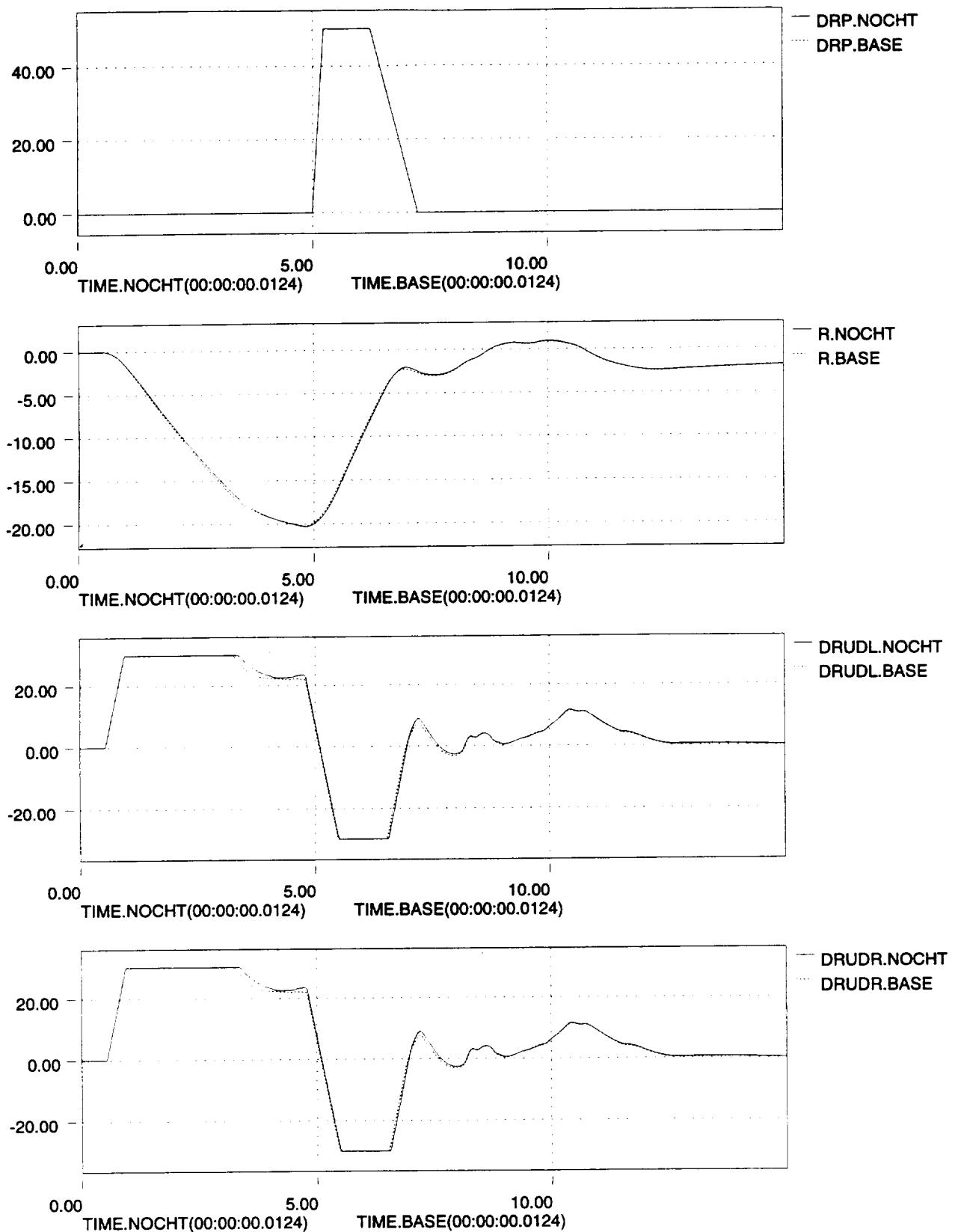
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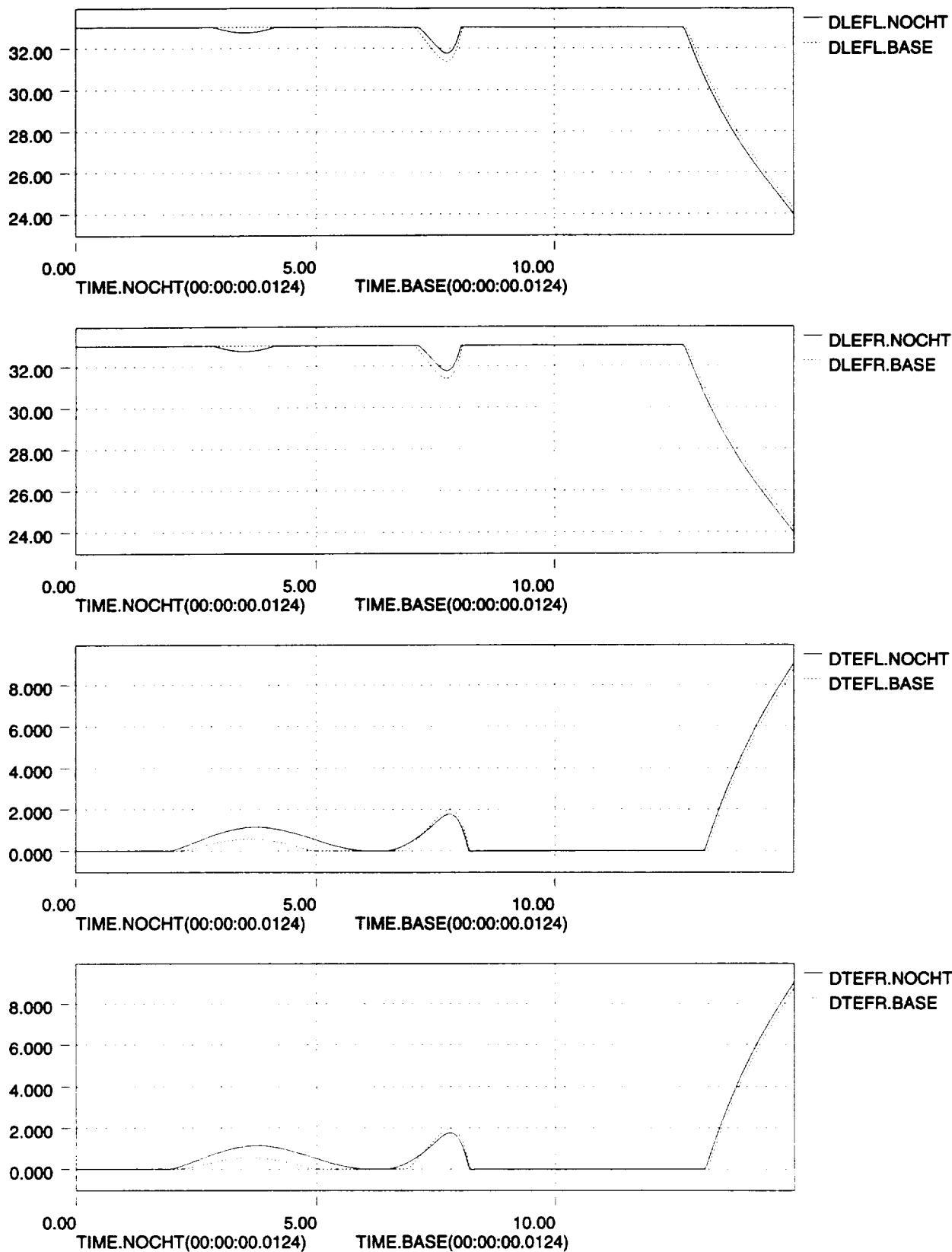
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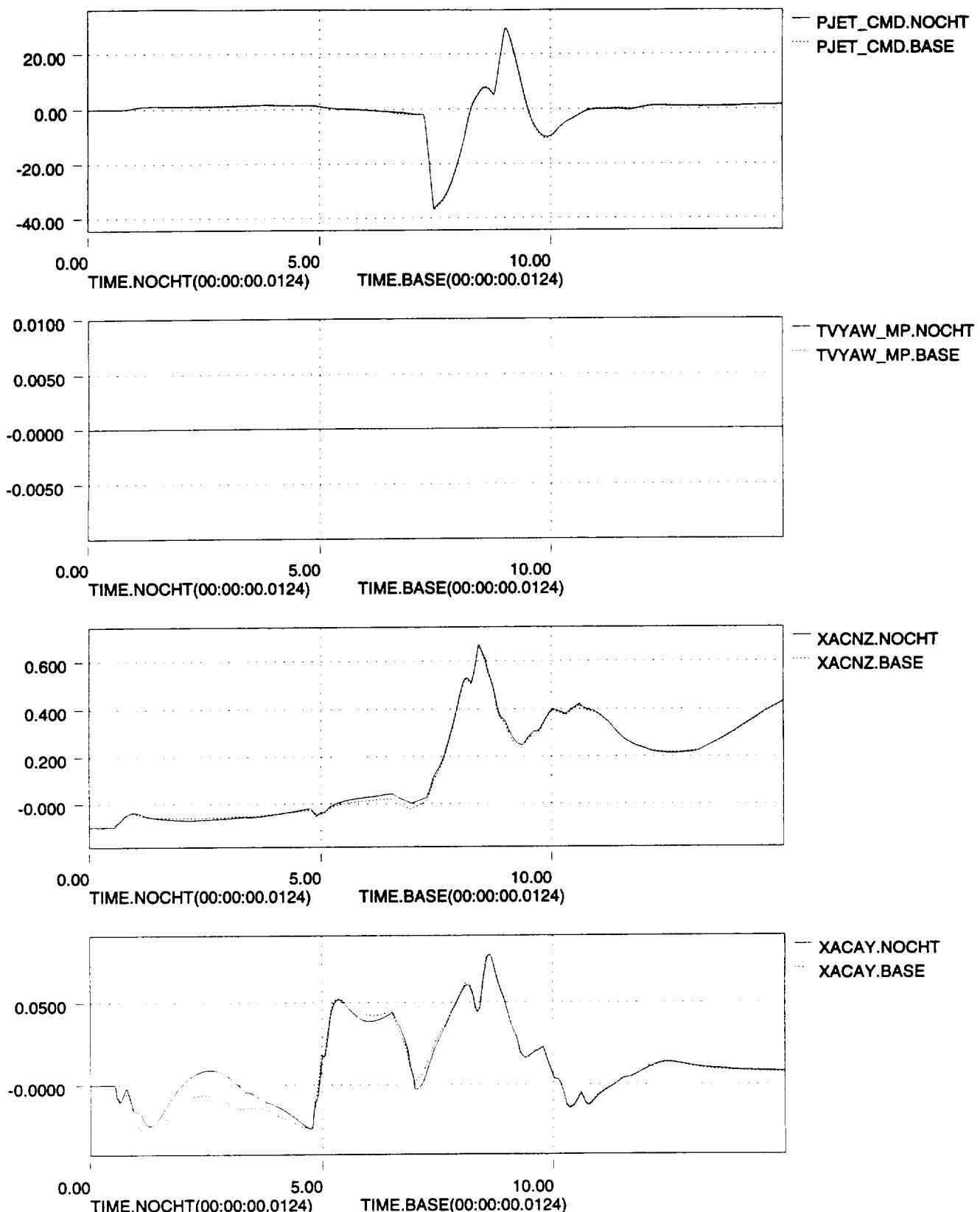
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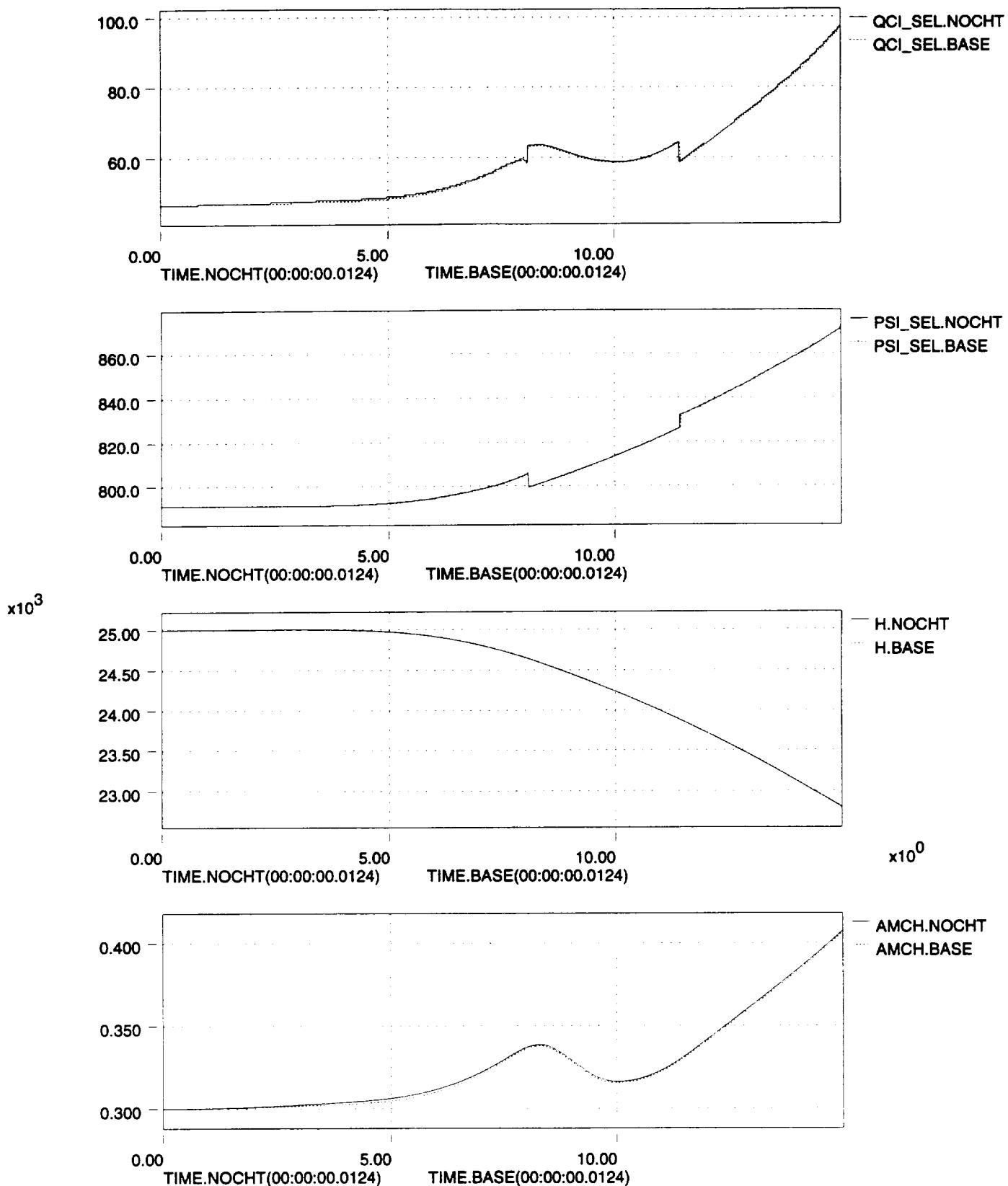
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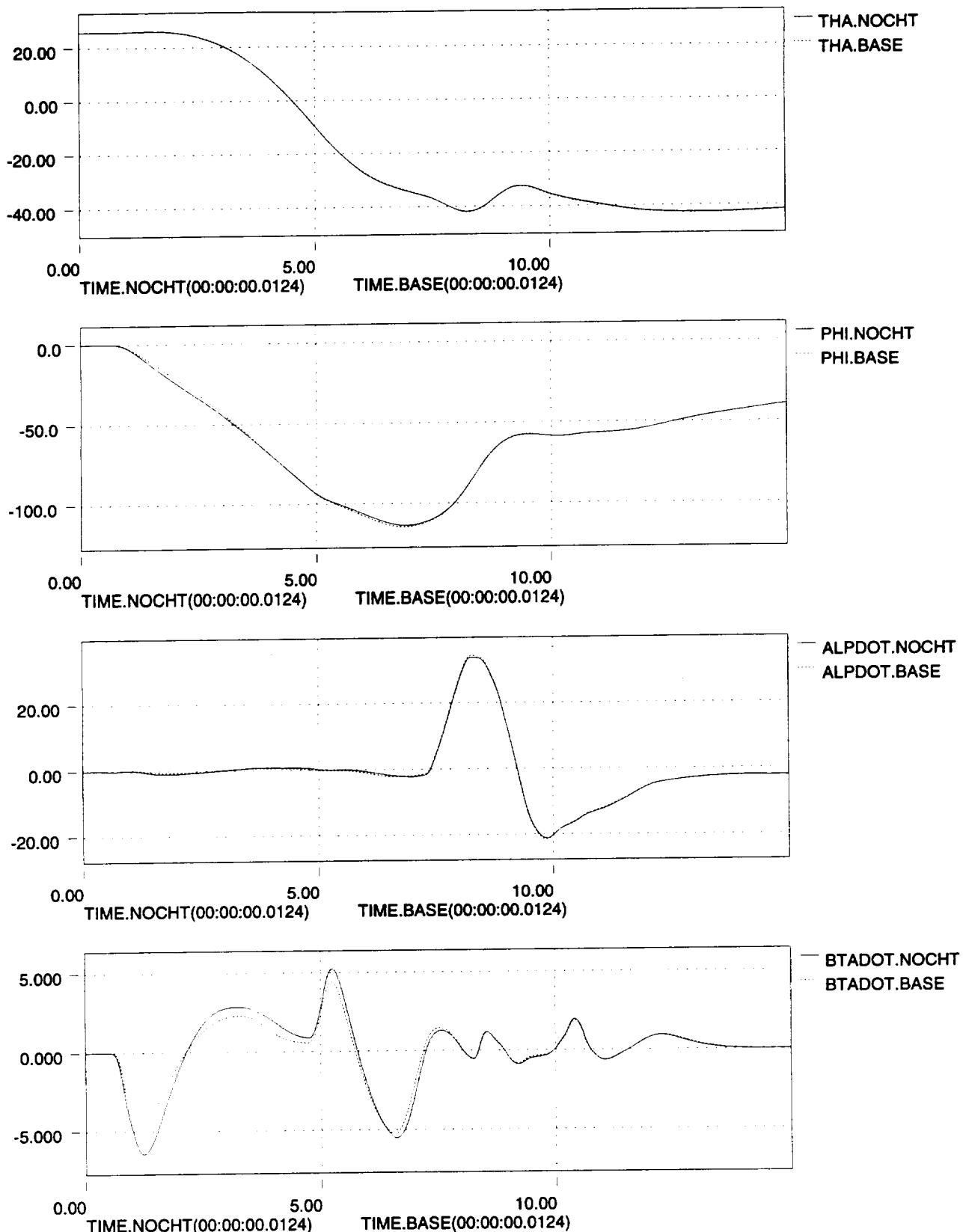
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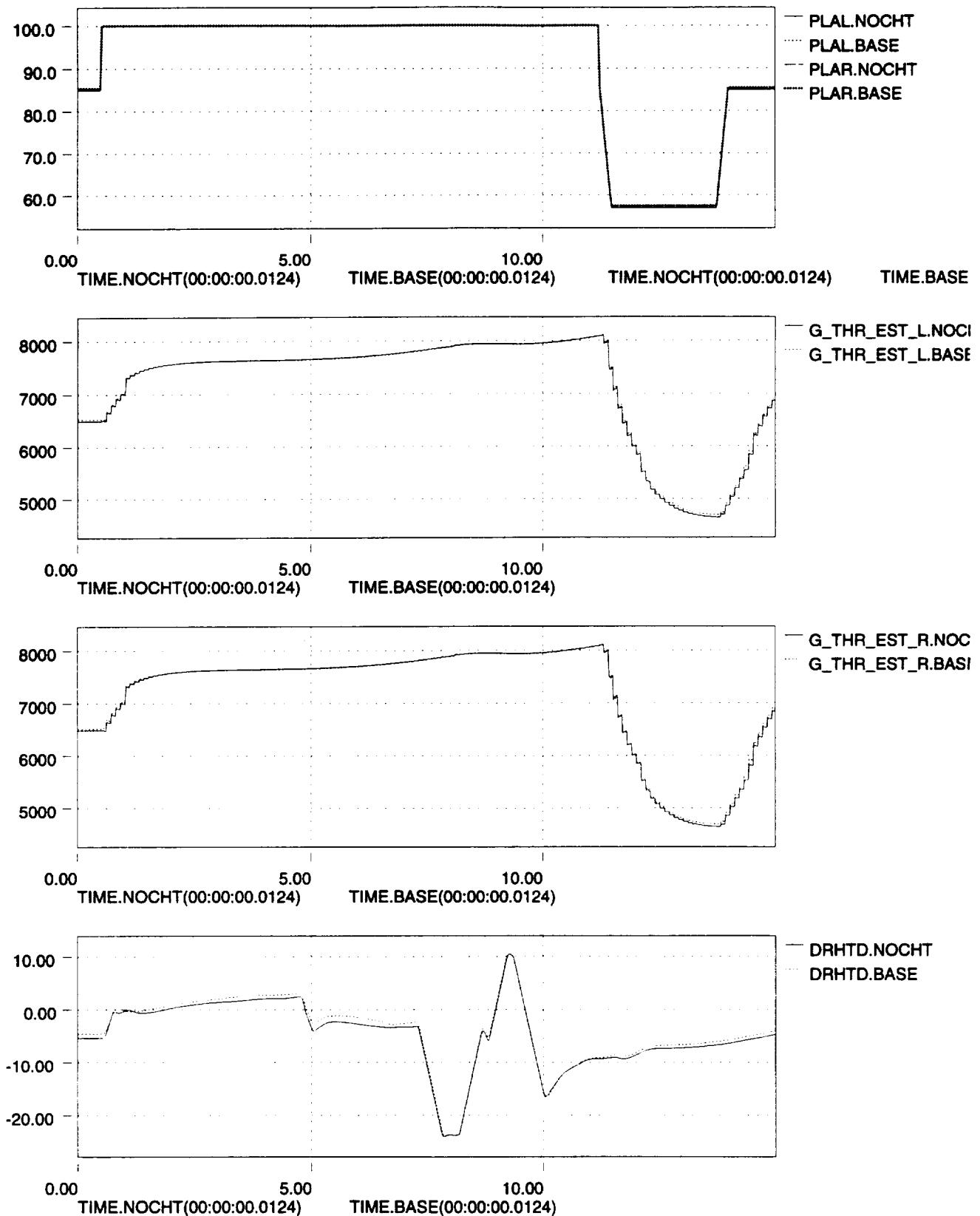
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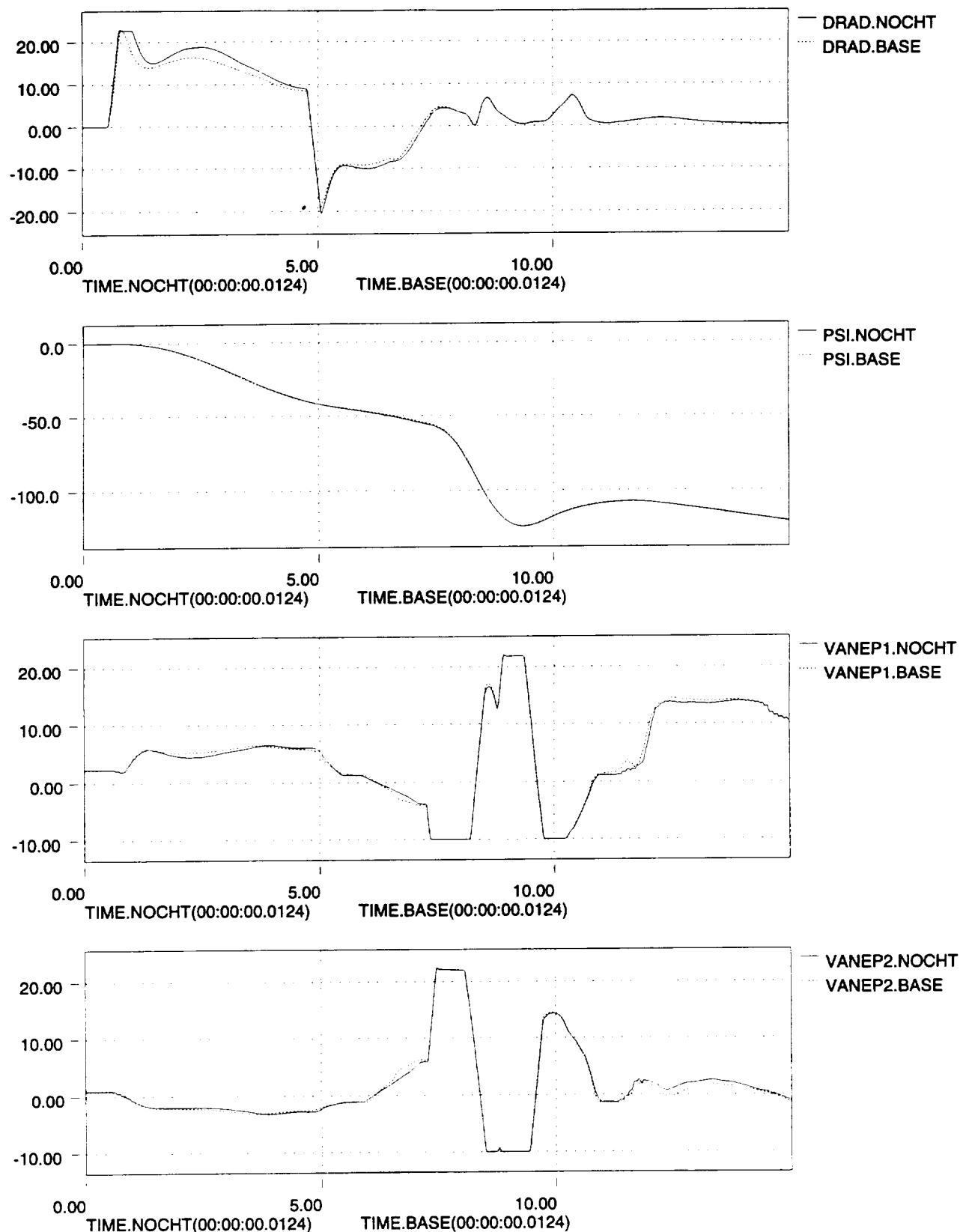
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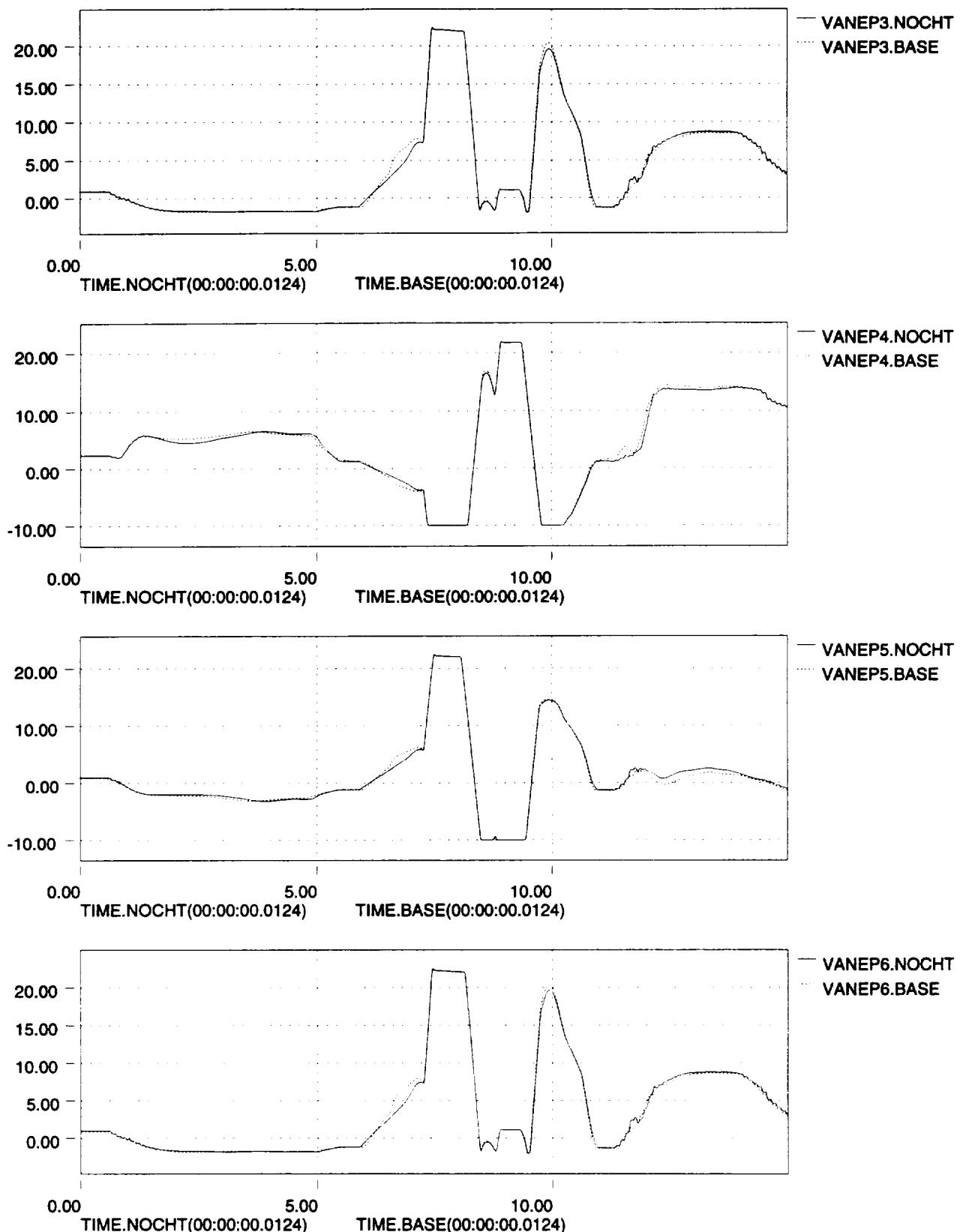
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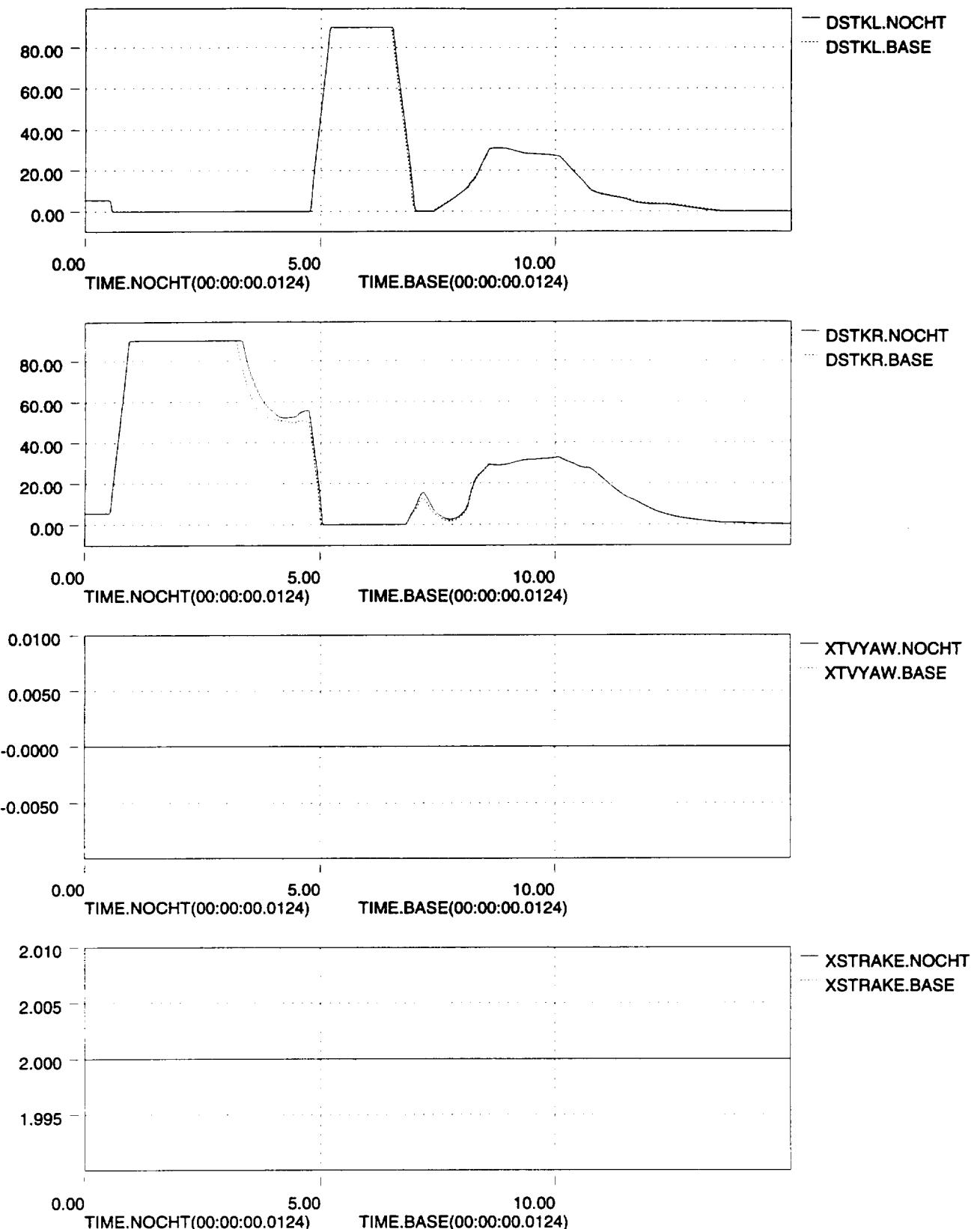
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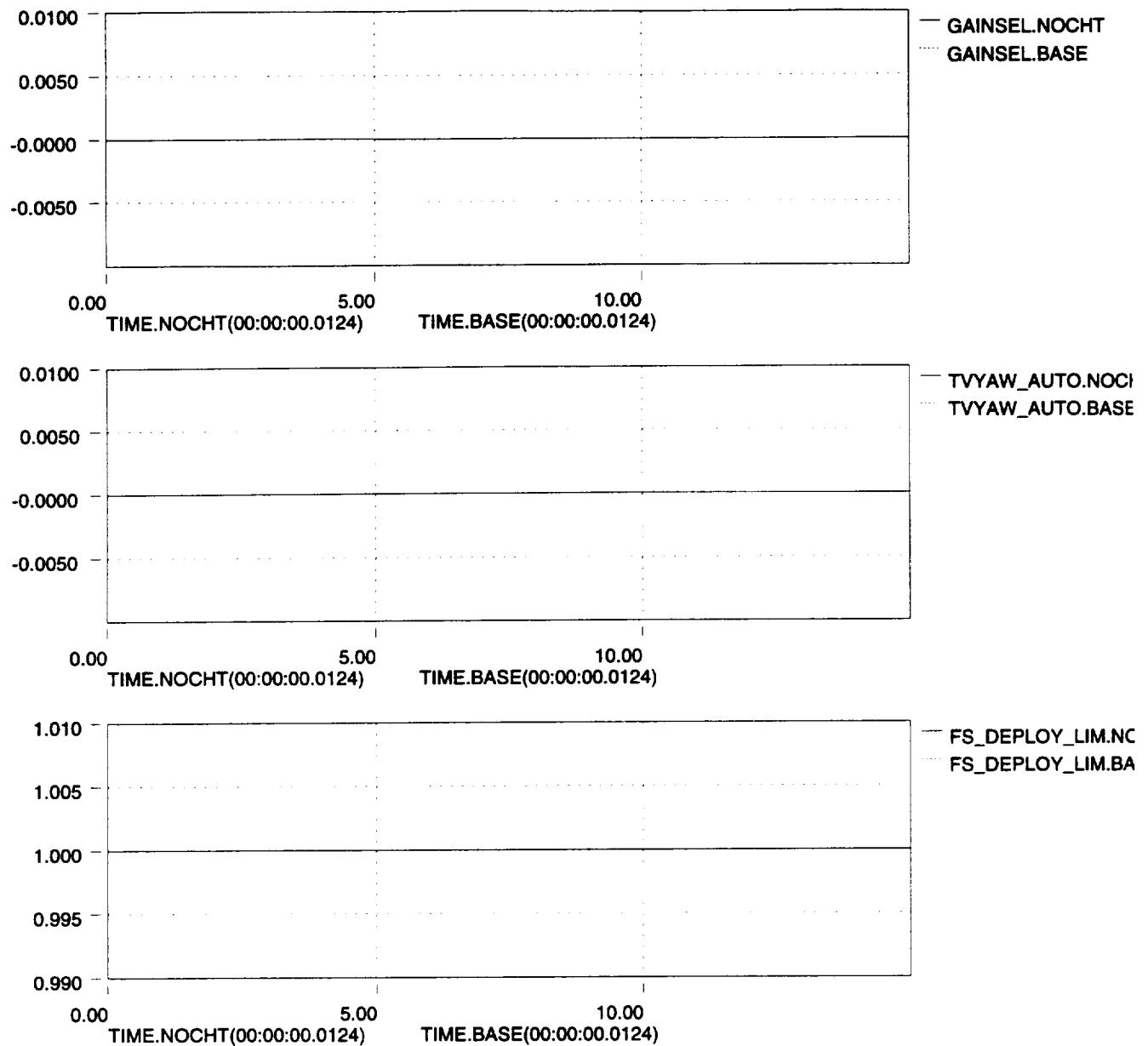
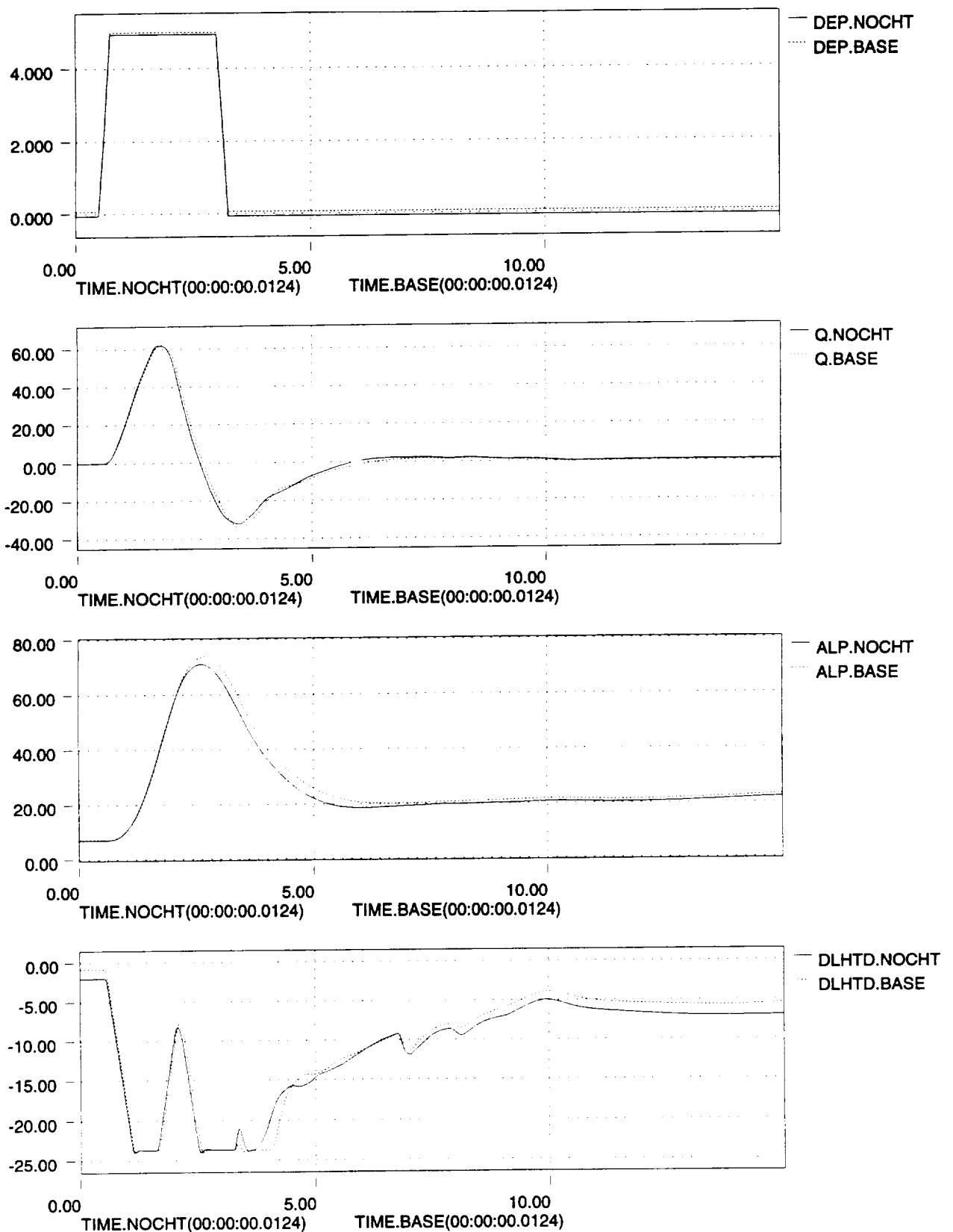
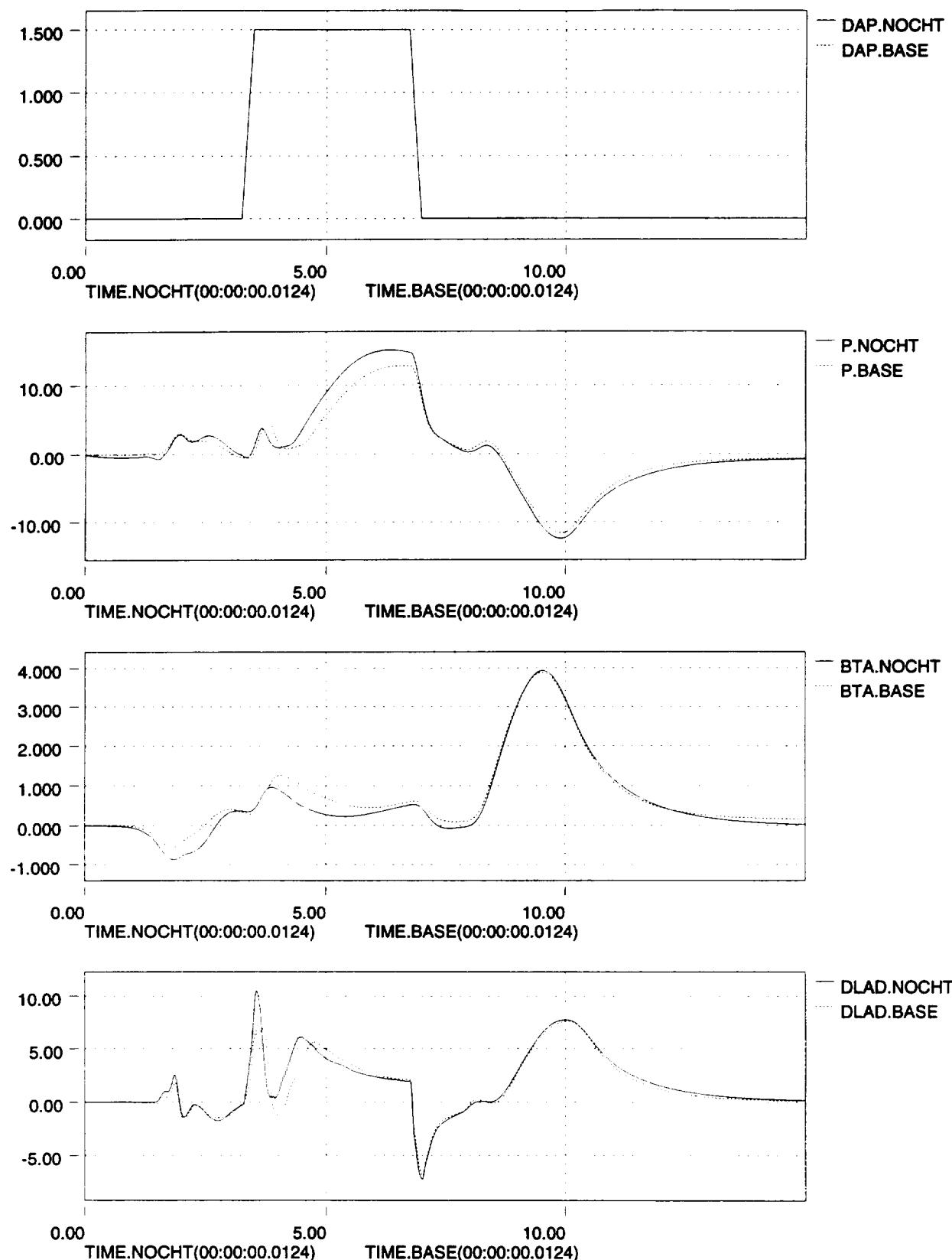


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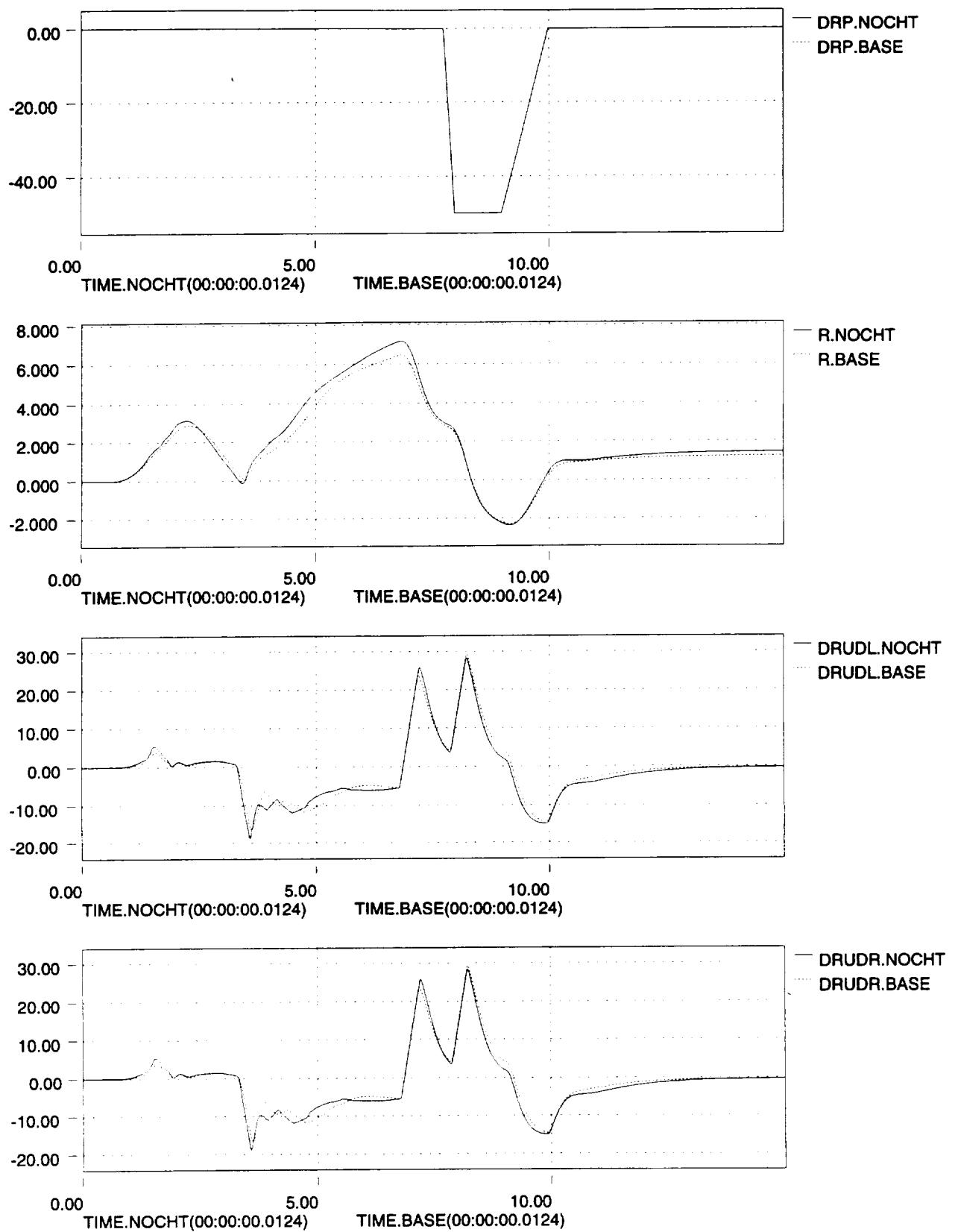
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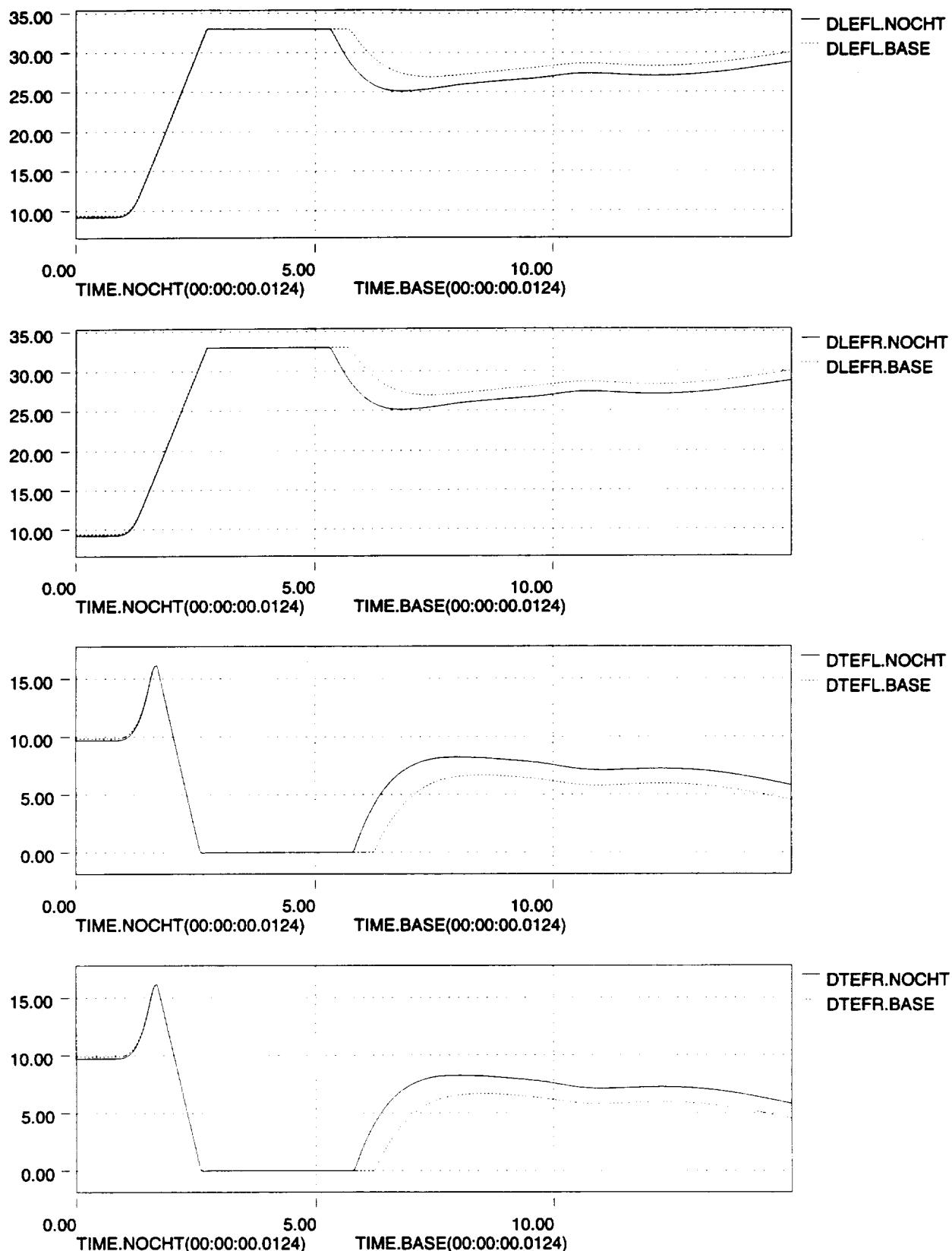
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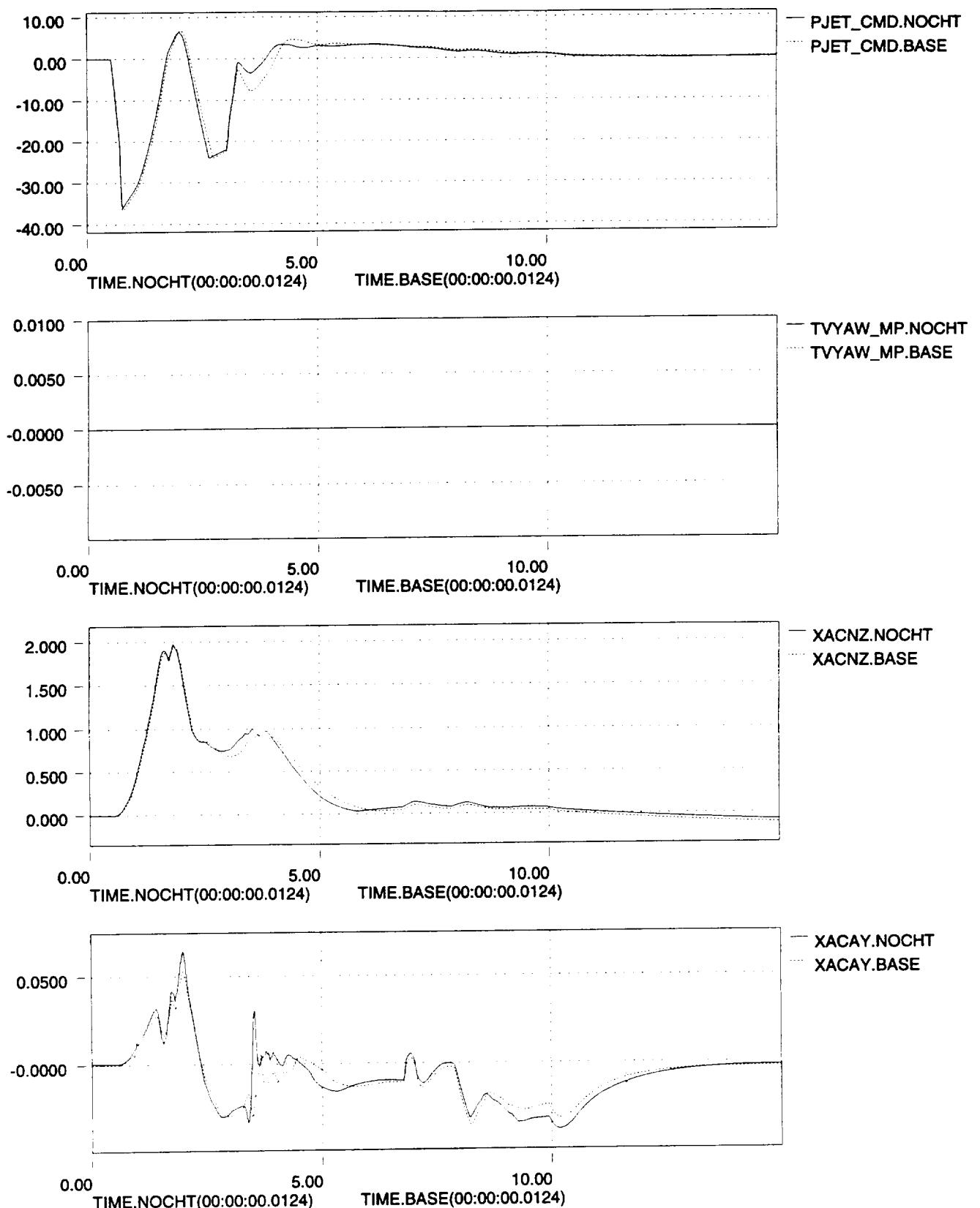
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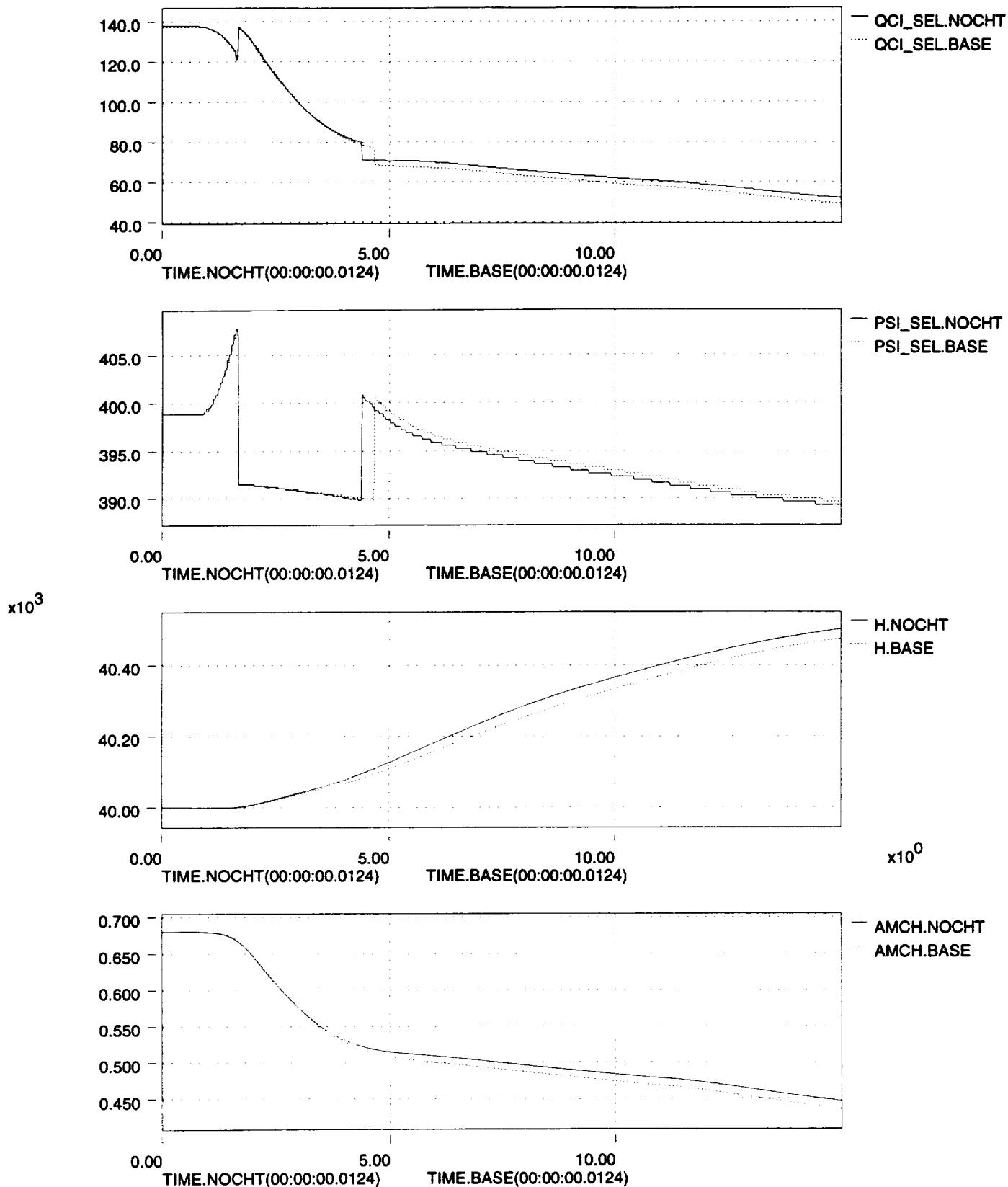
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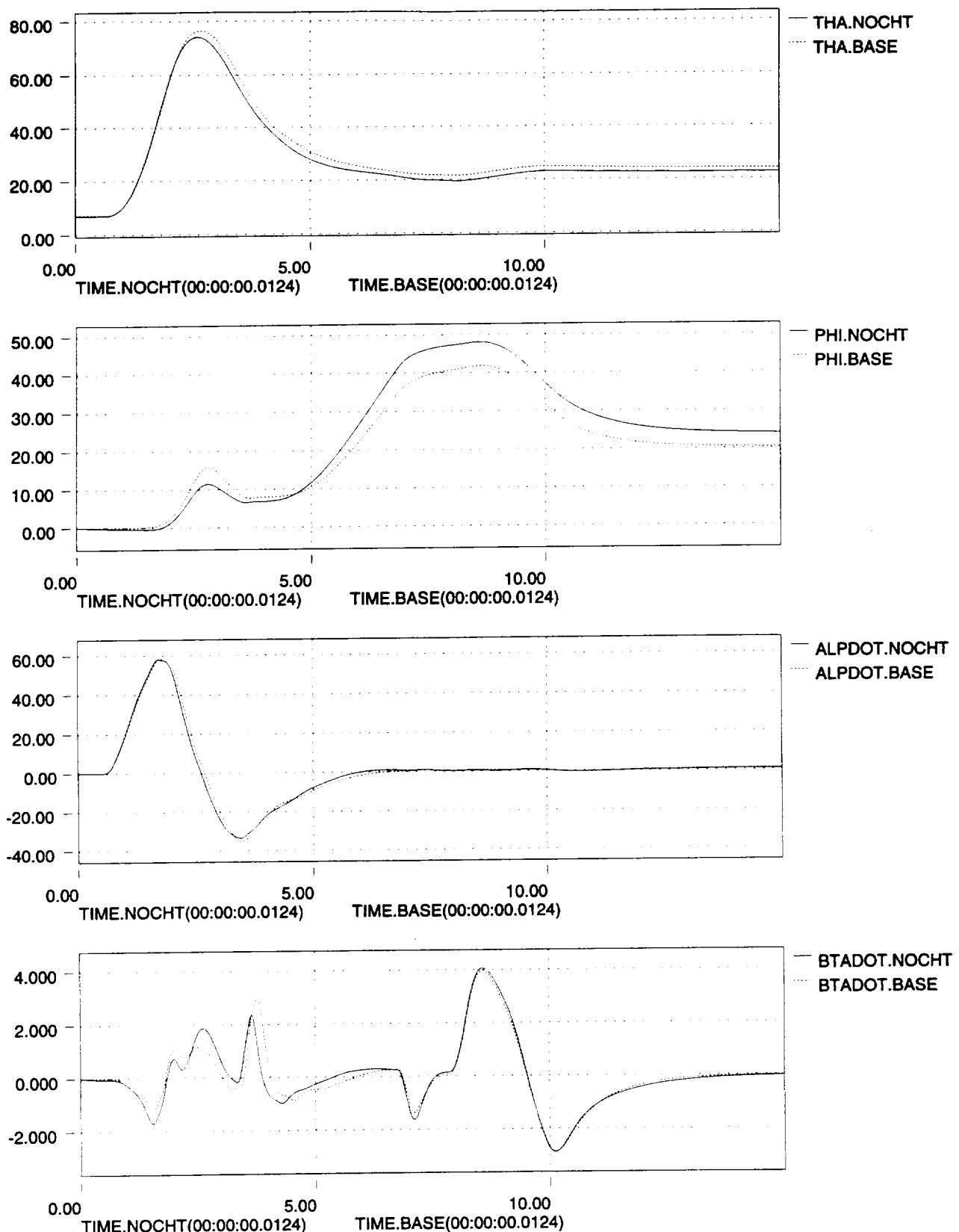
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30_S_Mode_.68-40k_trim--3_axis_input page 6/12



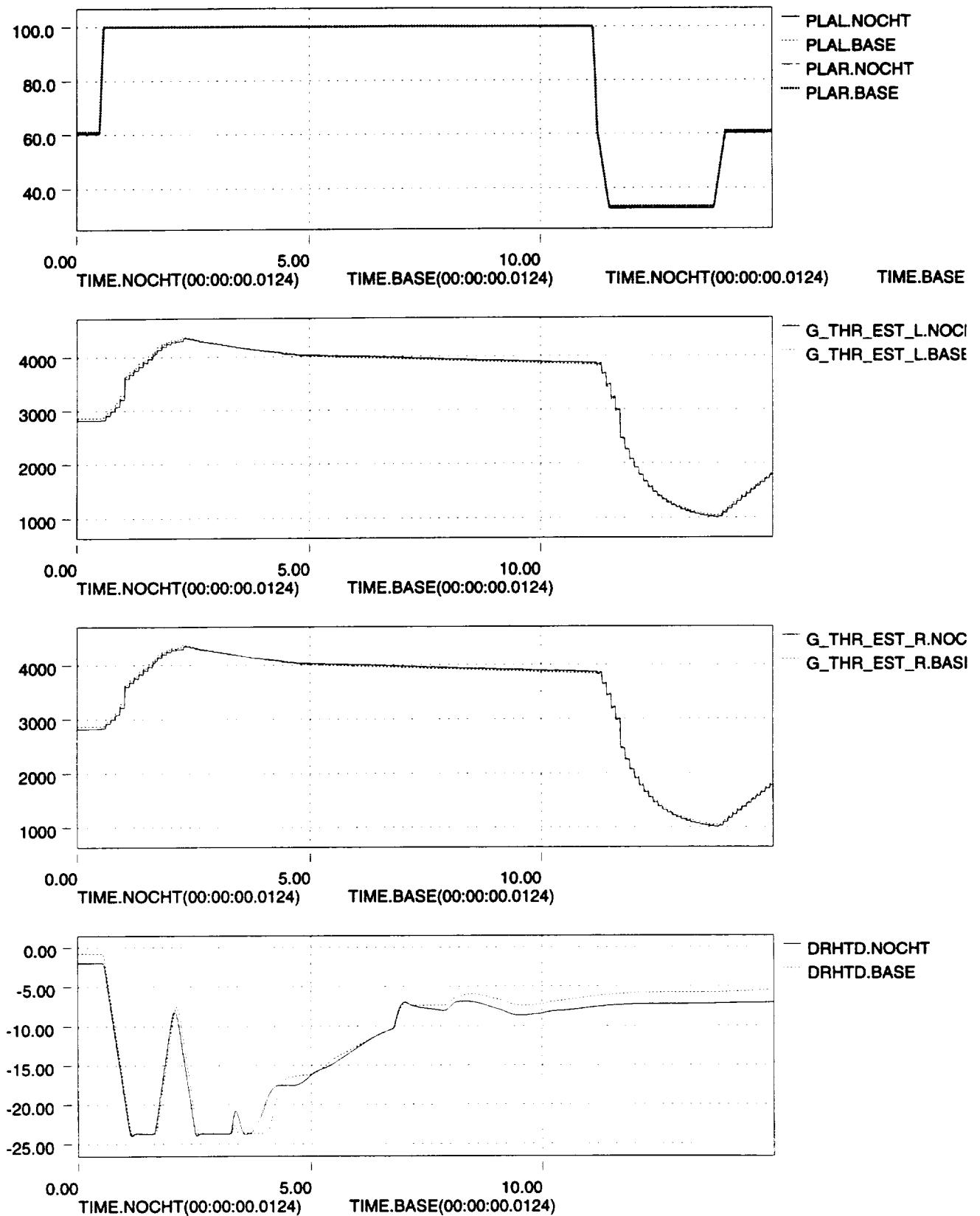
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30_S_Mode_68-40k_trim--3_axis_input page 7/12



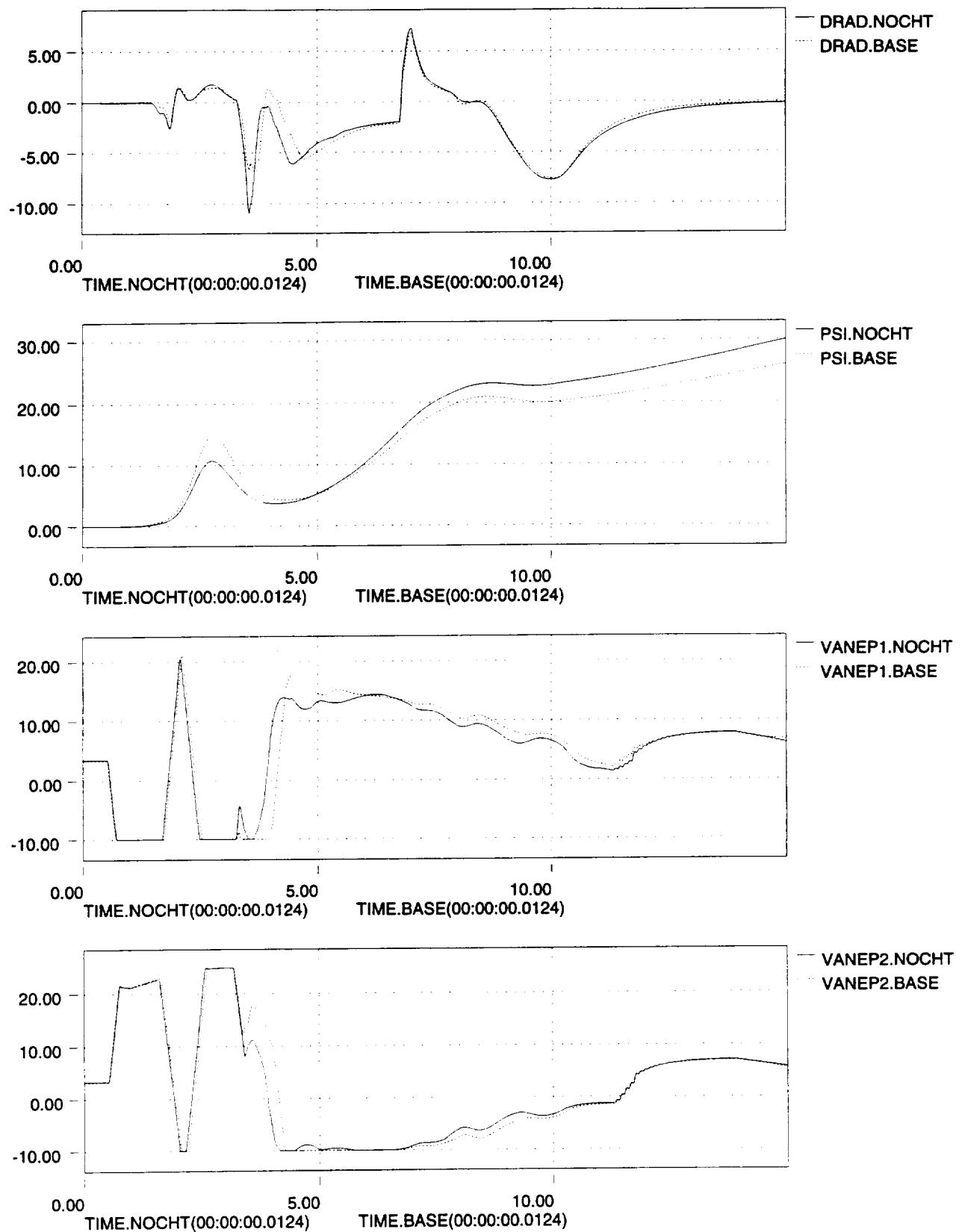
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30_S_Mode_.68-40k_trim-3_axis_input page 8/12



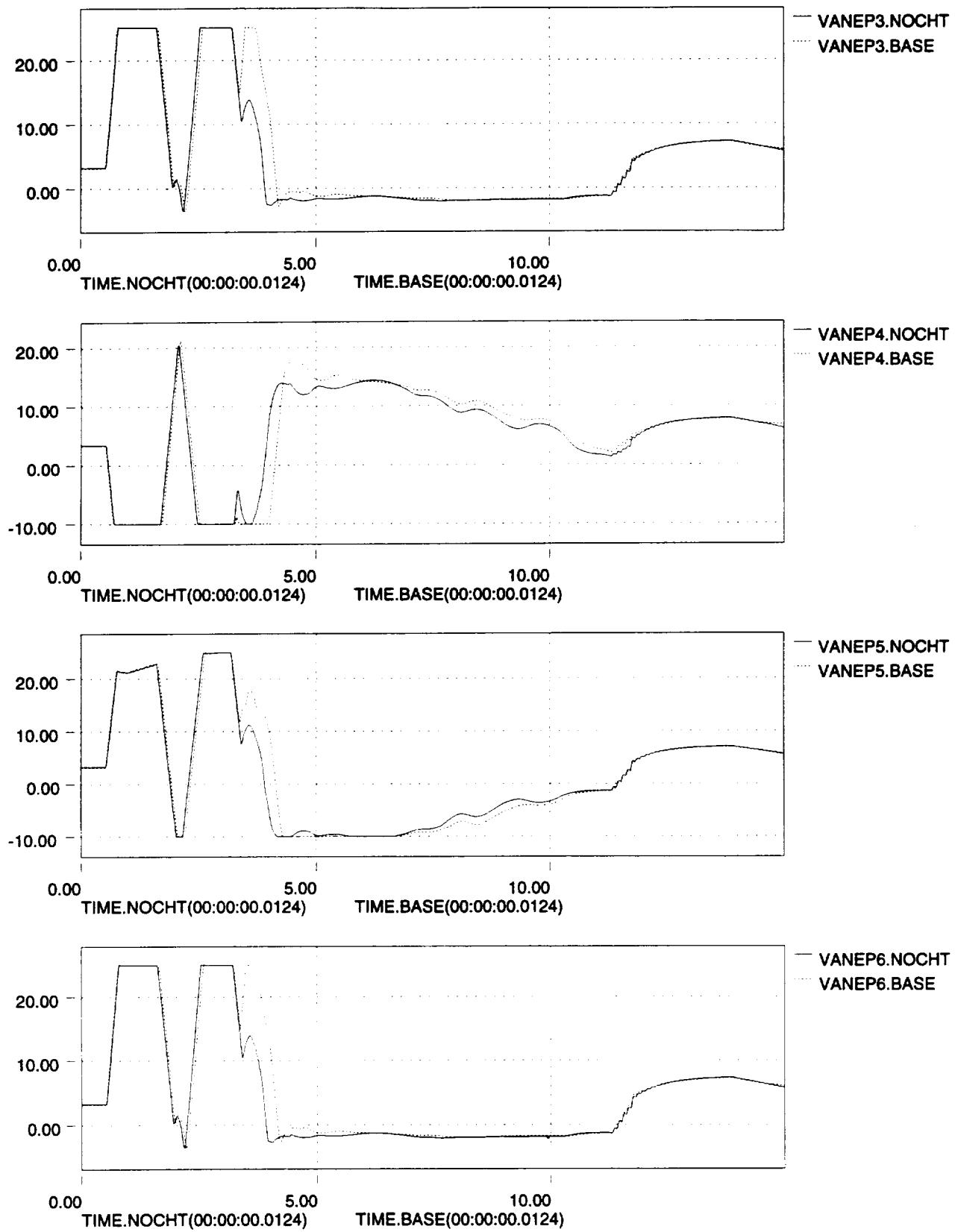
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30__S_Mode_.68-40k_trim--3_axis_input page 9/12



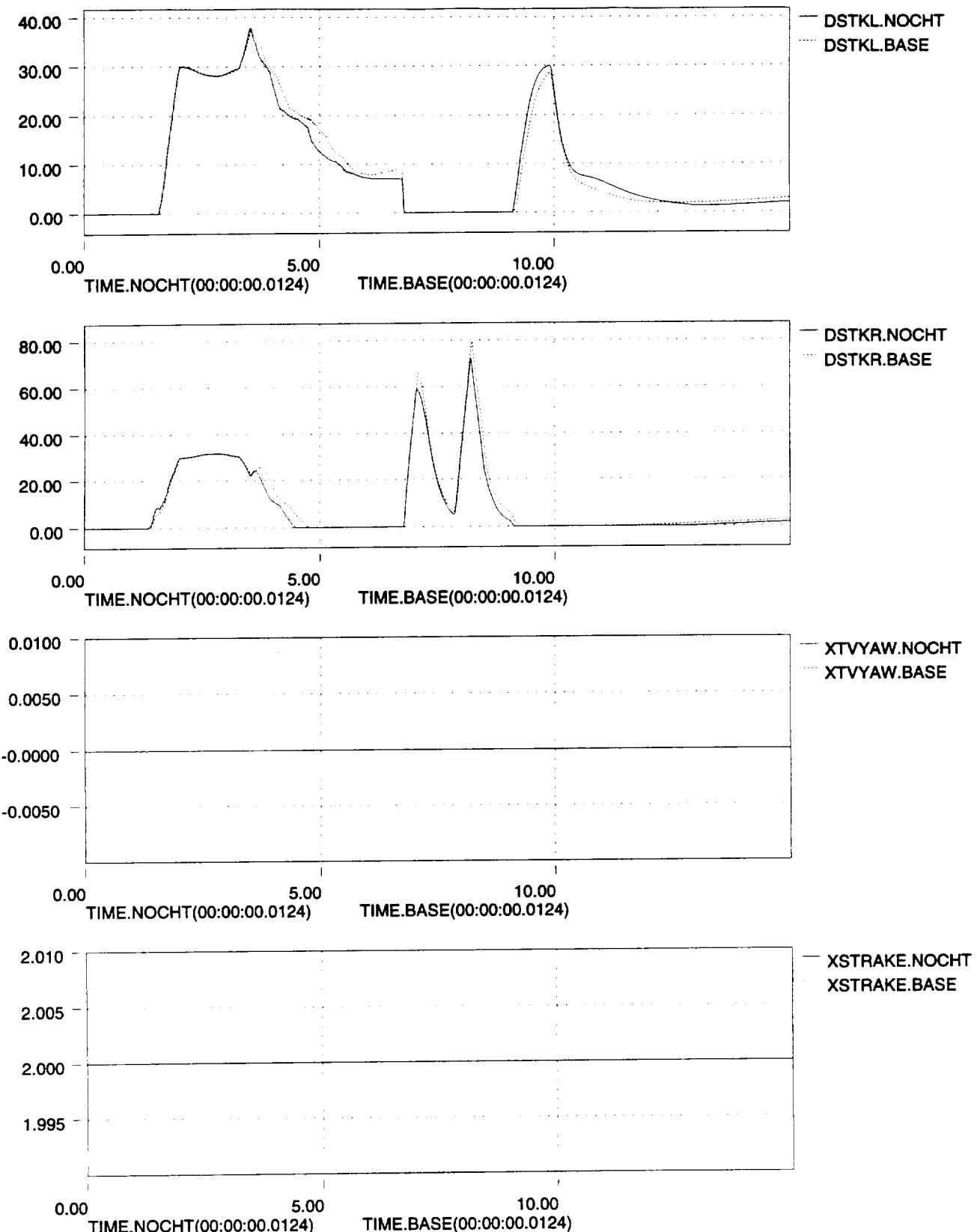
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30_S_Mode_.68-40k_trim--3_axis_input page 10/12



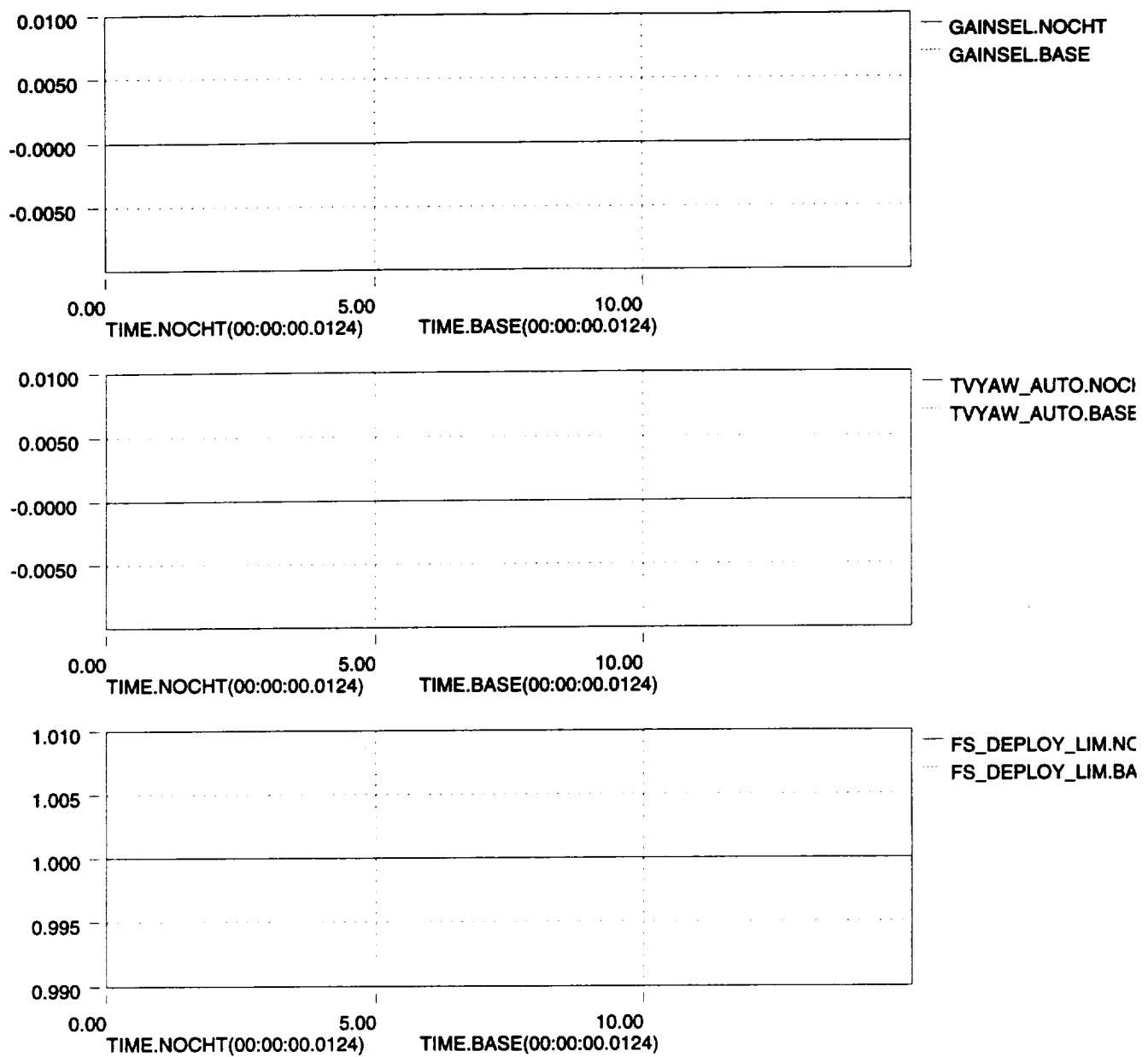
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30__S_Mode__.68-40k_trim--3_axis_input page 11/12



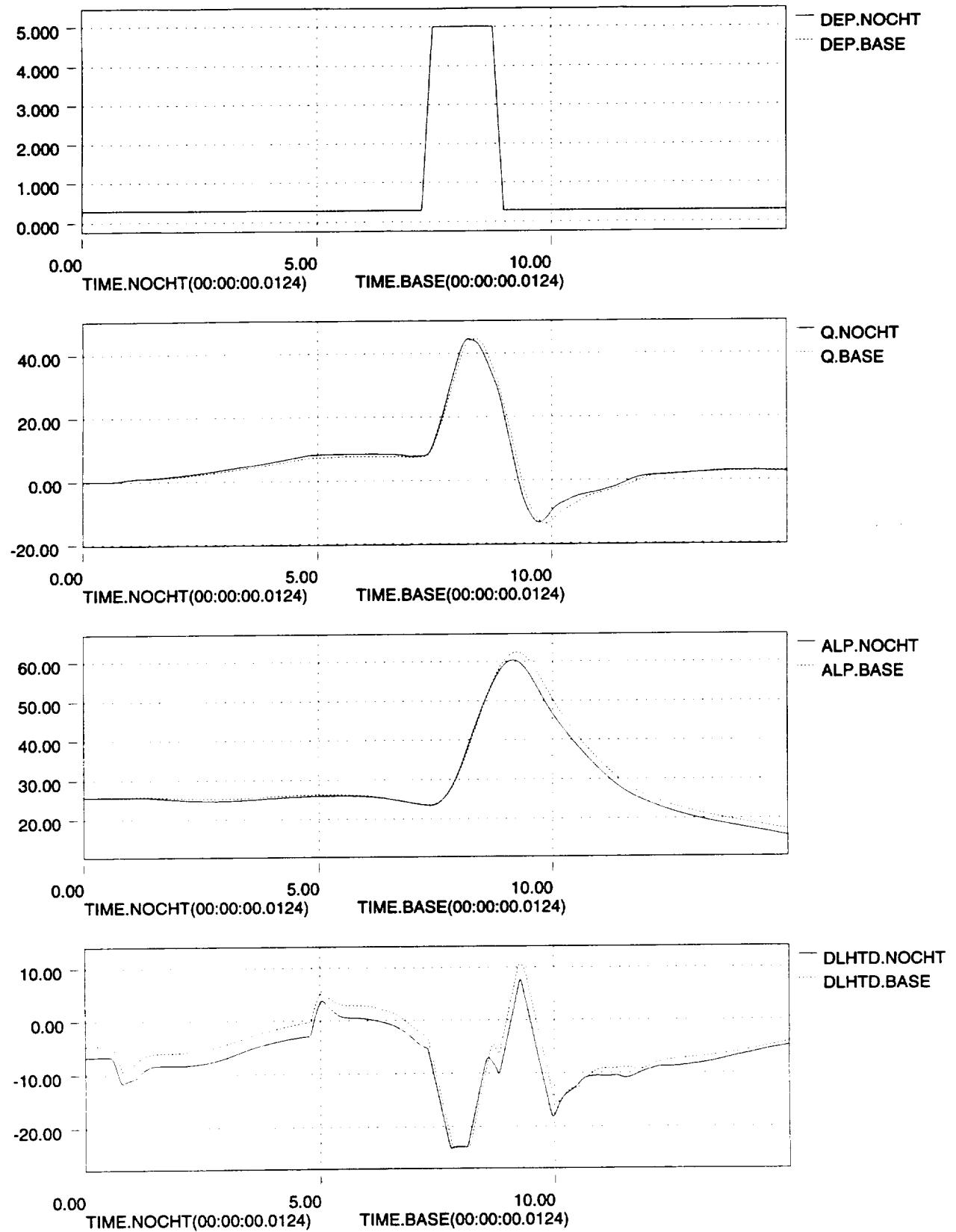
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Figure 3 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_30_S_Mode_.68-40k_trim--3_axis_input page 12/12



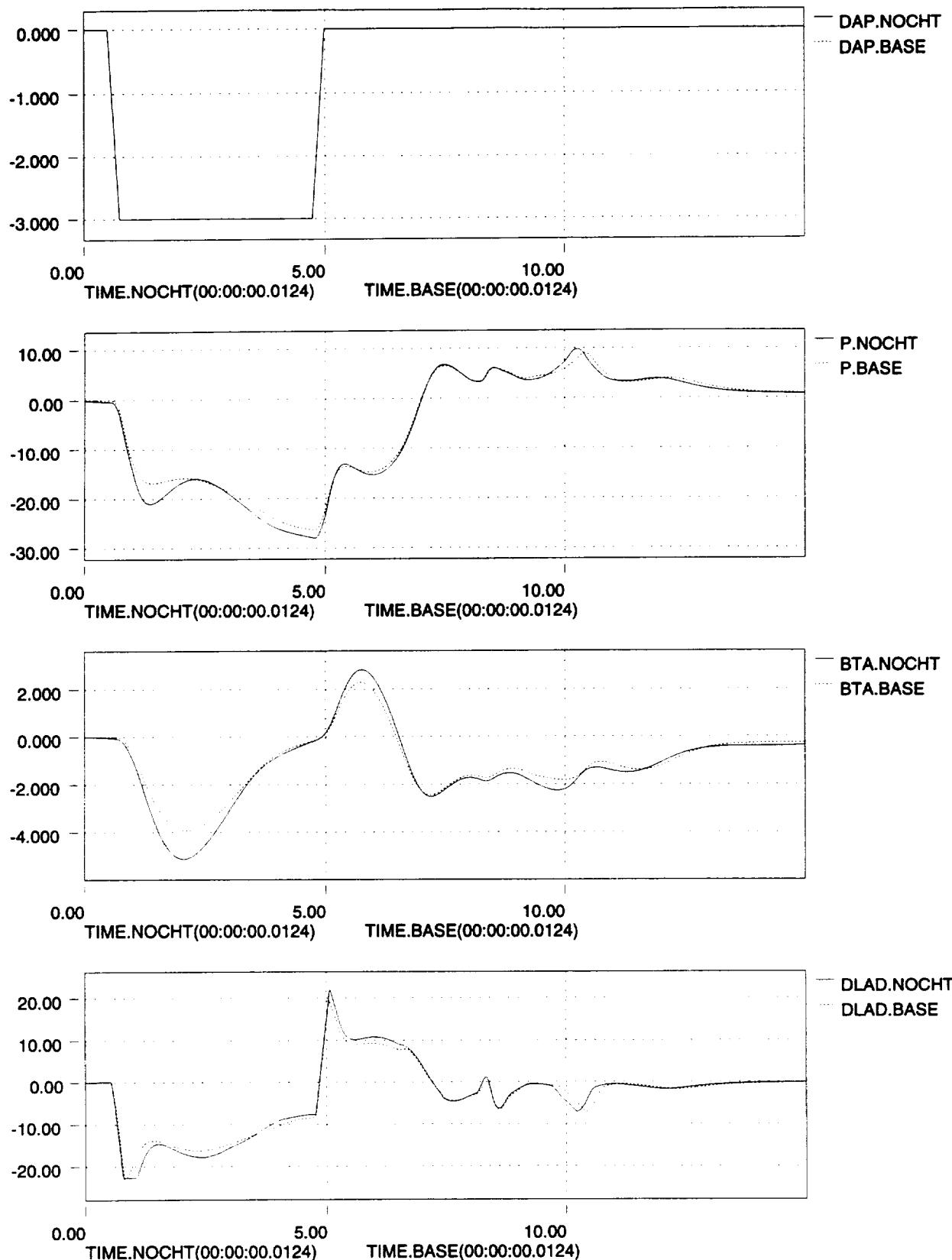
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 1/12



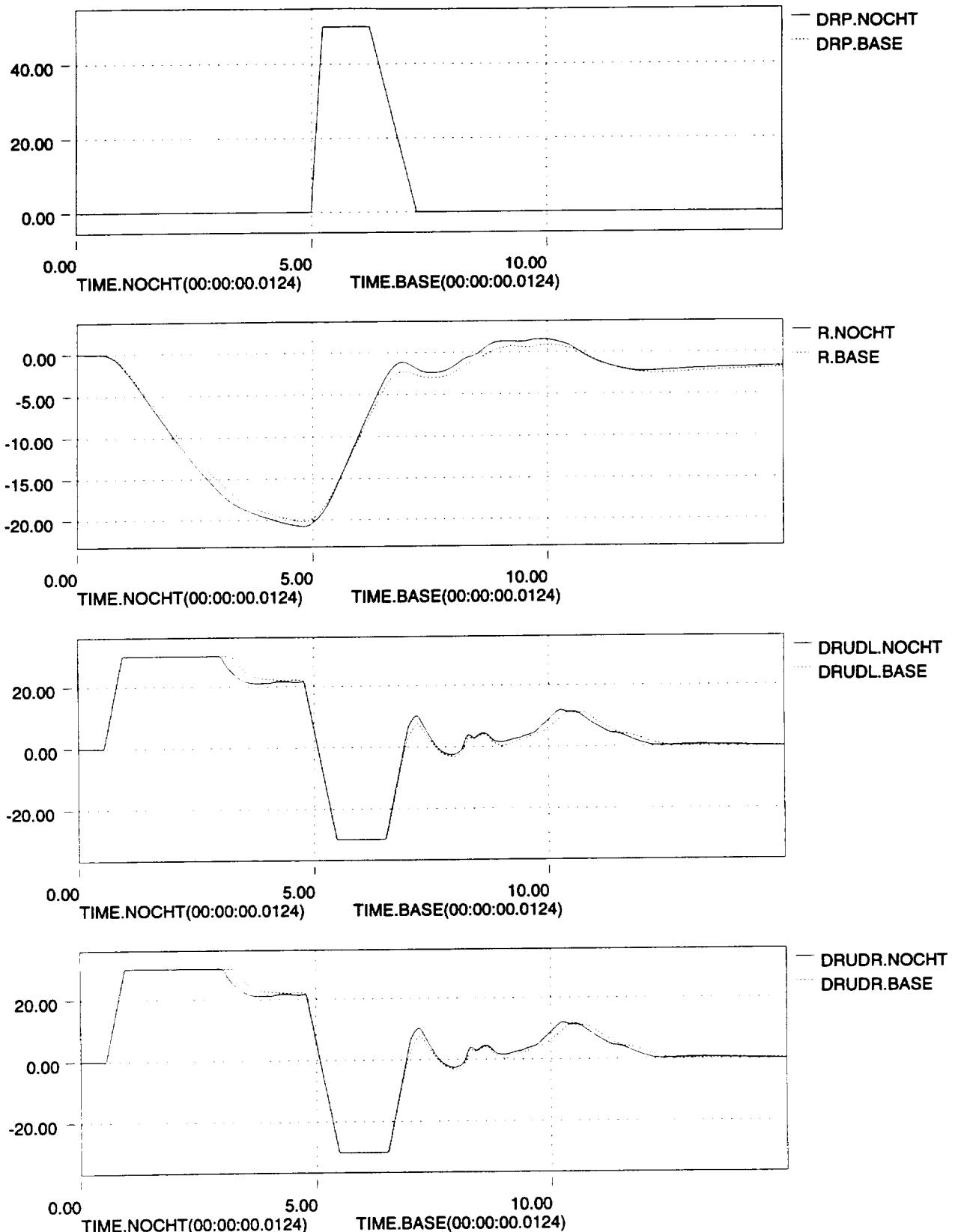
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 2/12



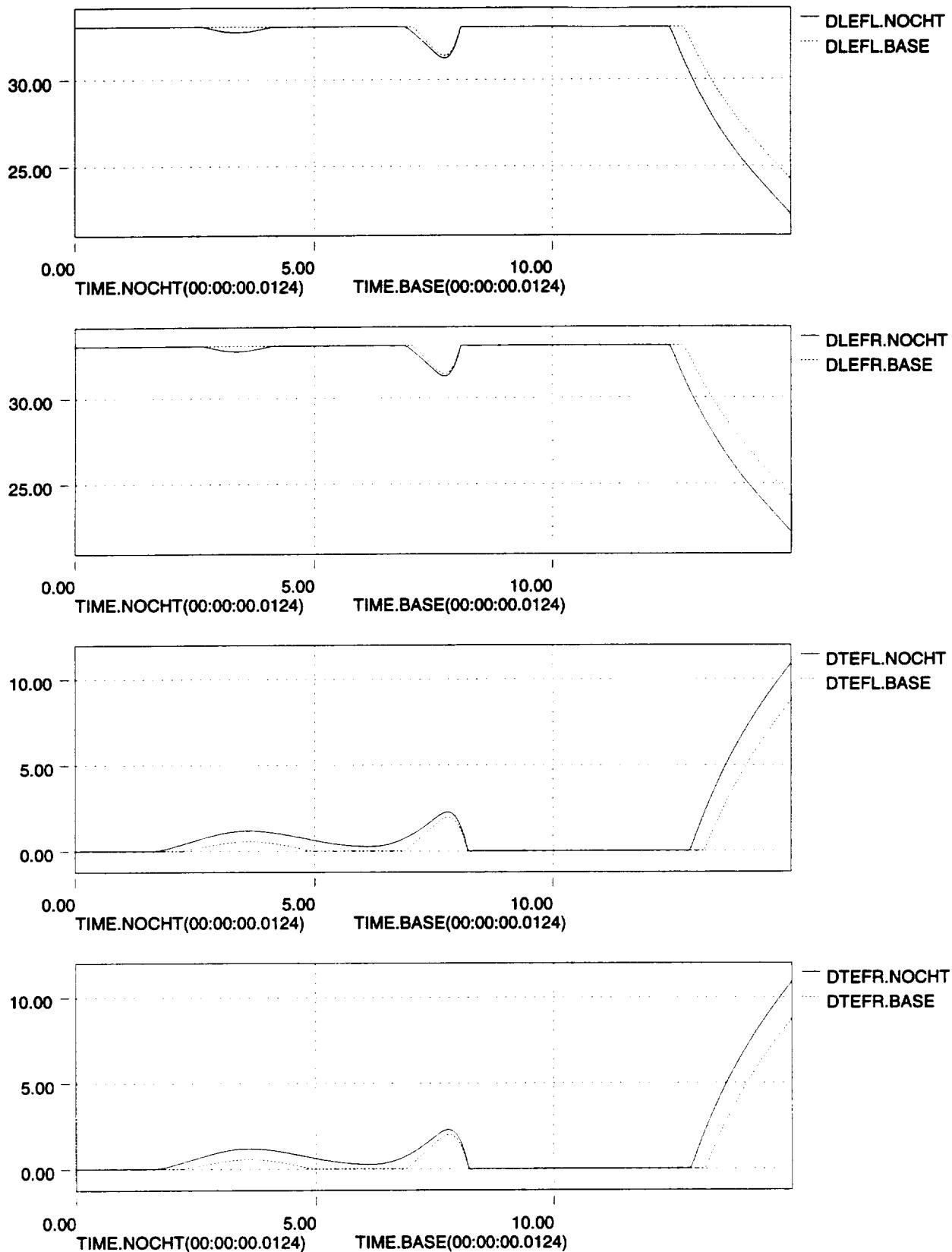
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 3/12



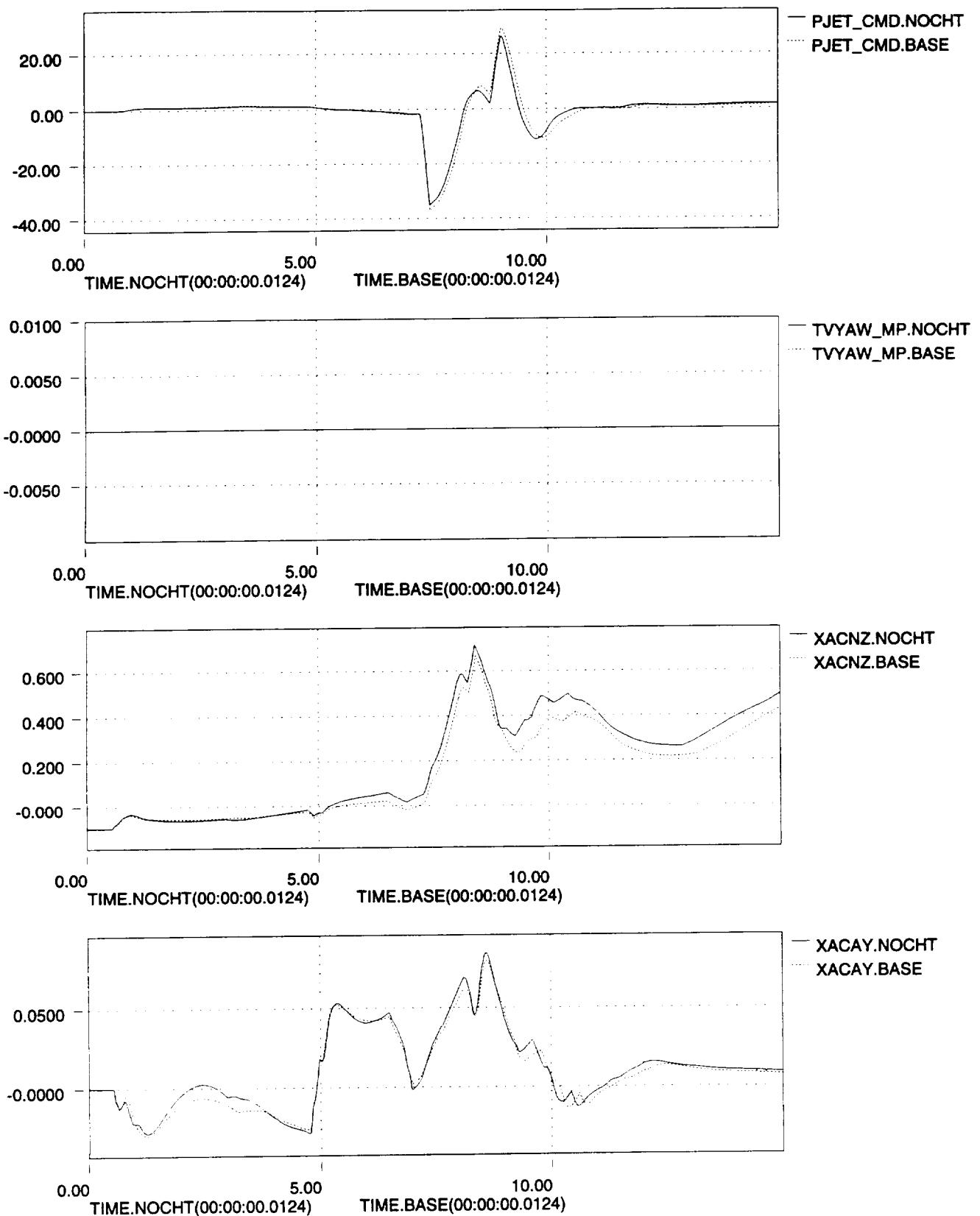
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim-3_axis_input page 4/12



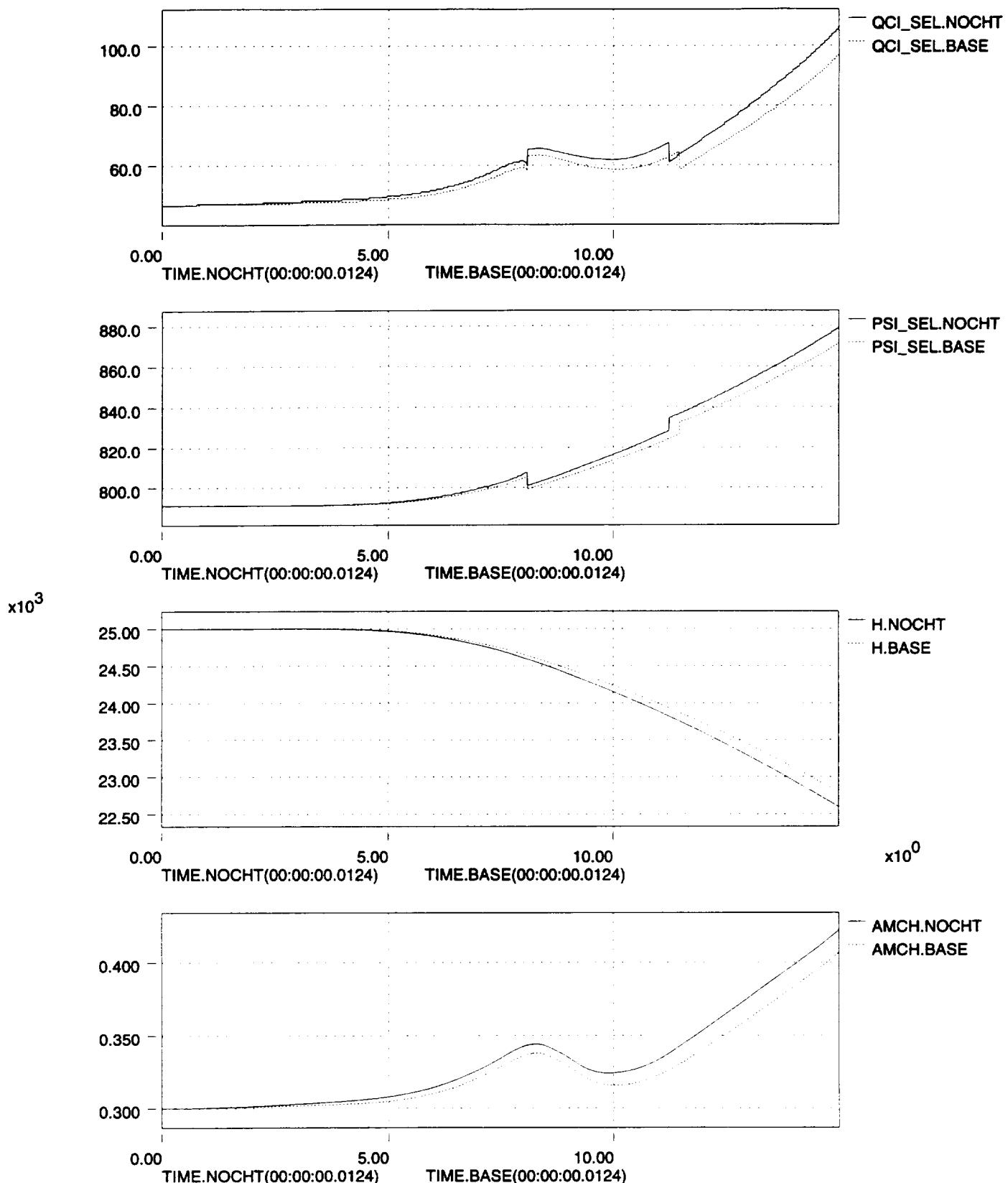
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 5/12



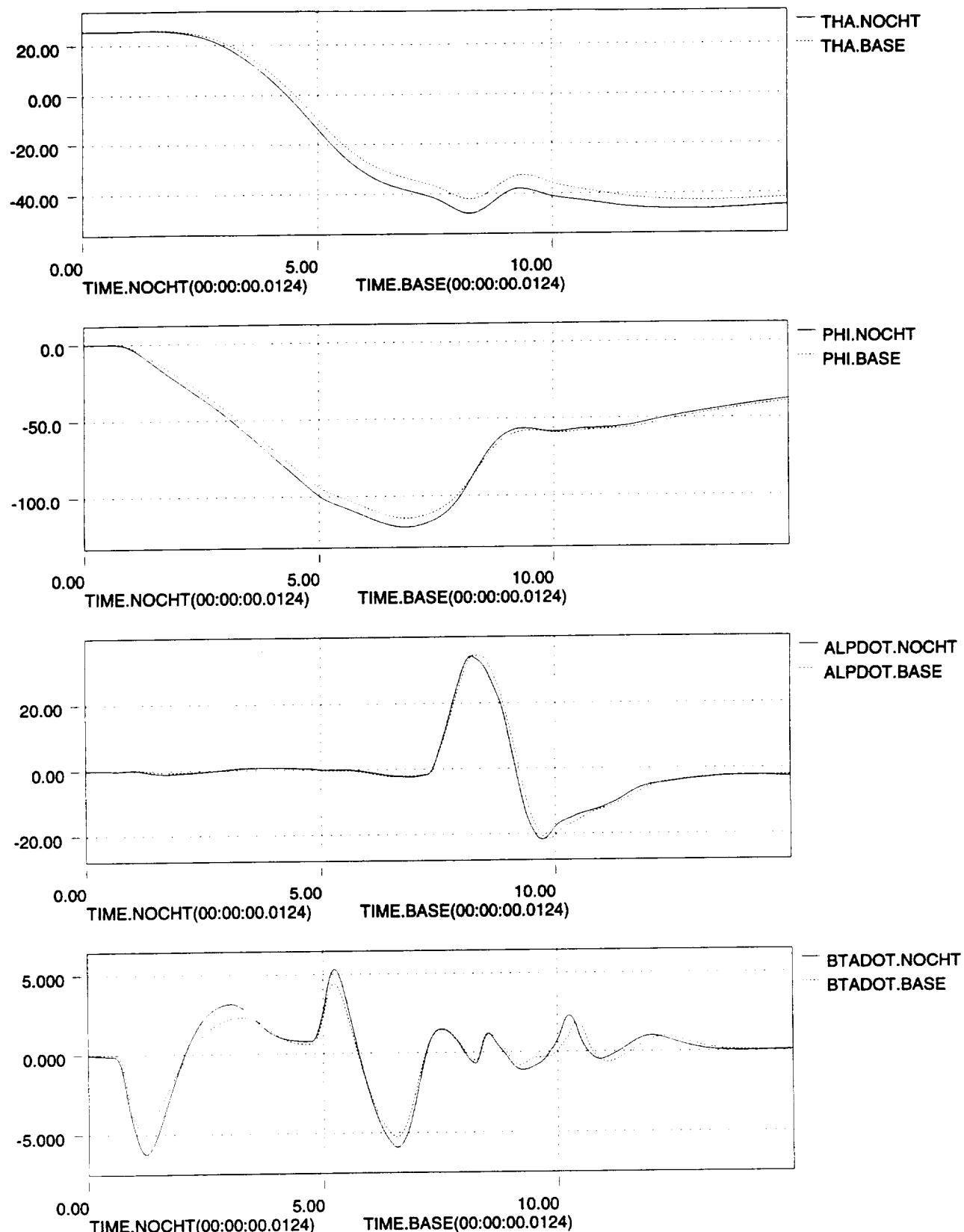
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 6/12



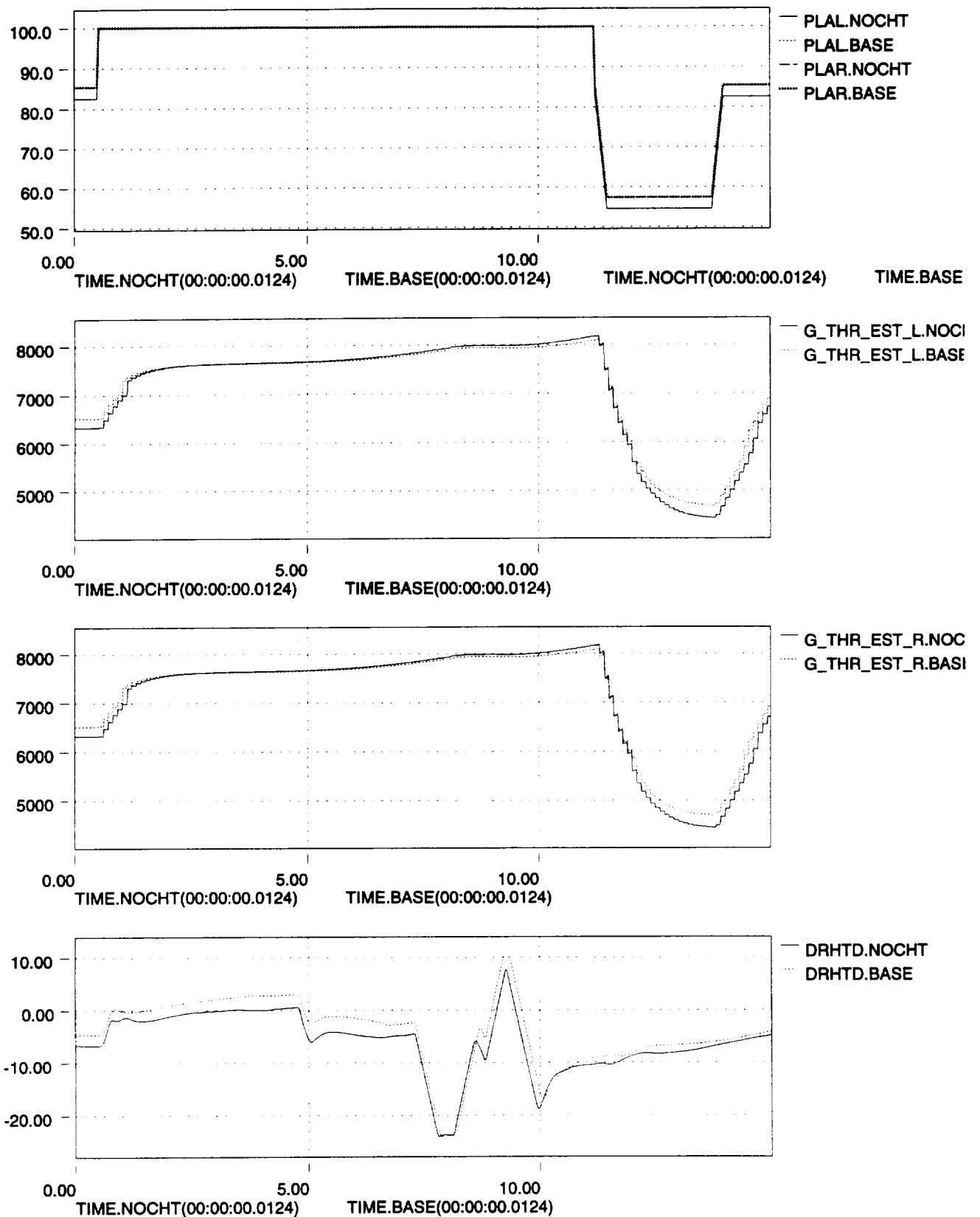
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim-3_axis_input page 7/12



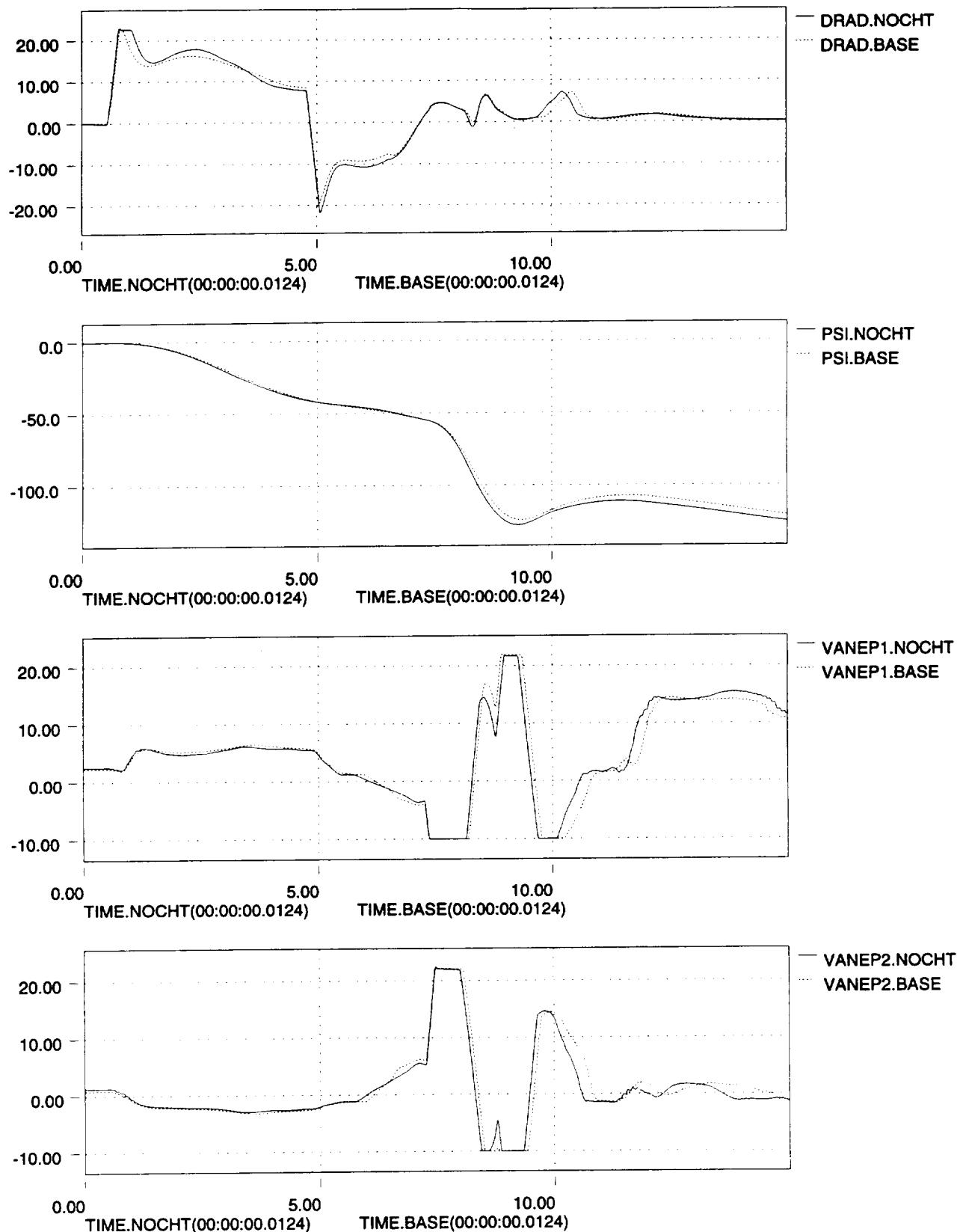
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim-3_axis_input page 8/12



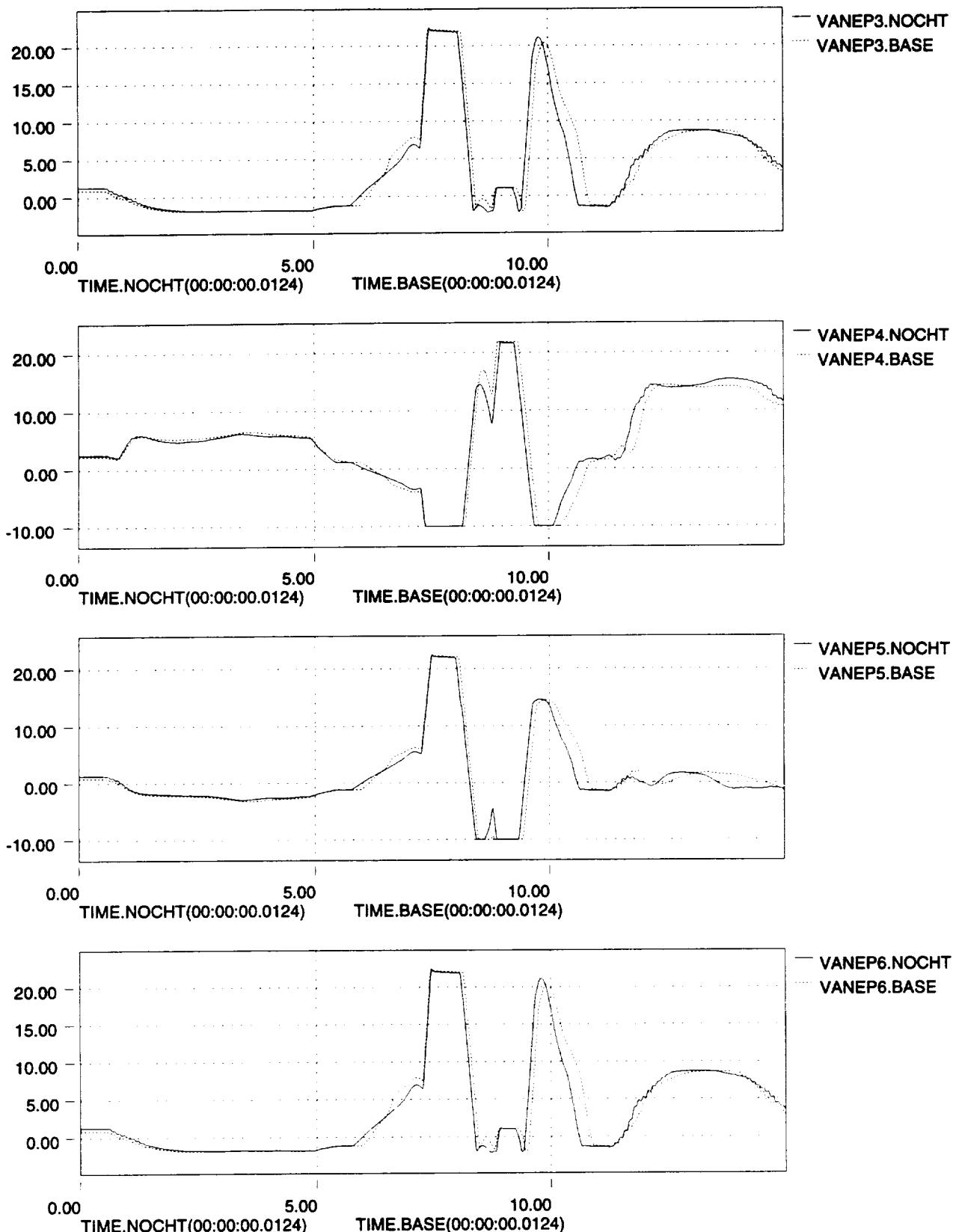
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim-3_axis_input page 9/12



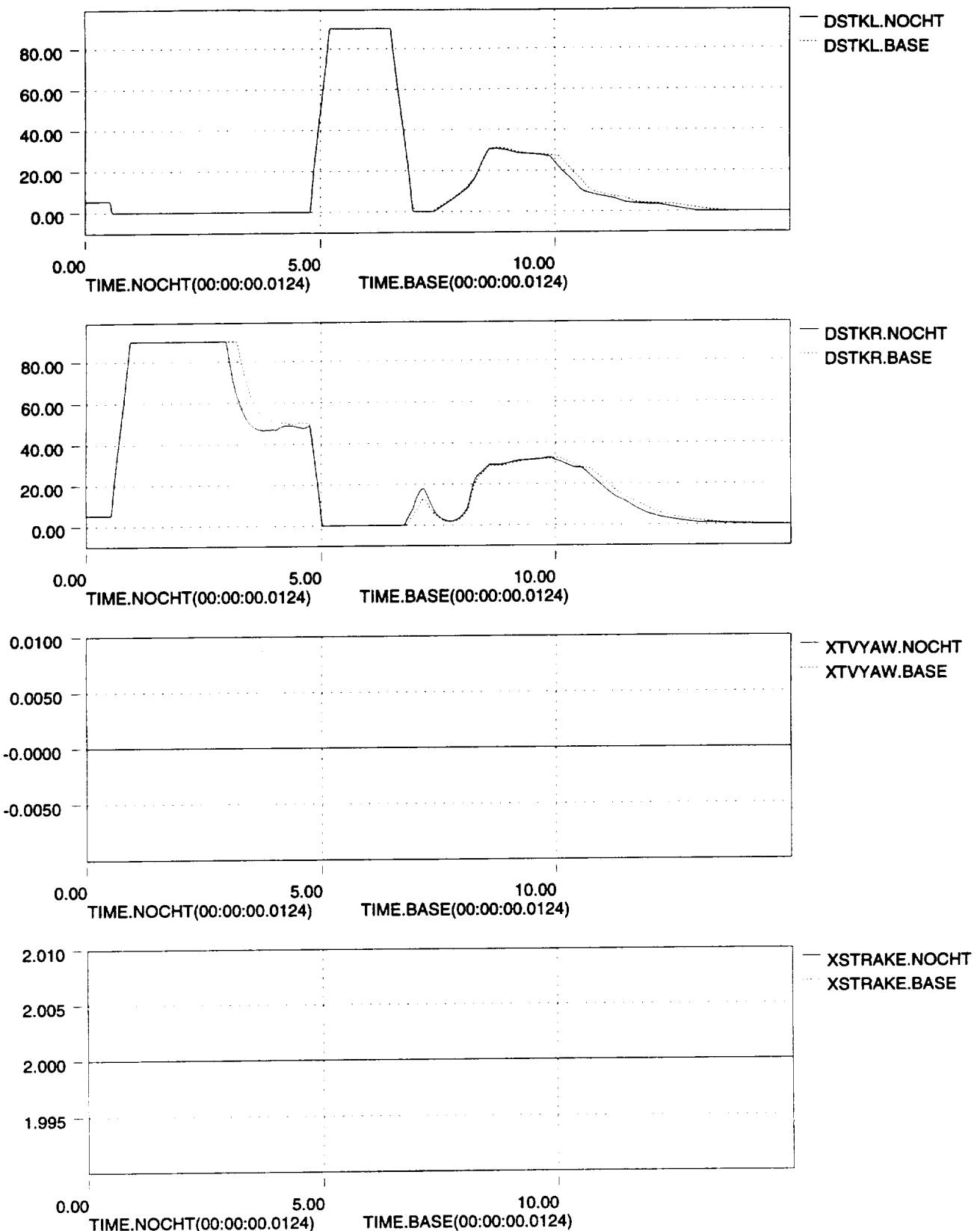
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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 10/12



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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim--3_axis_input page 11/12



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Figure 4 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
CASE_33_S_Mode_.4-25k_trim-3_axis_input page 12/12

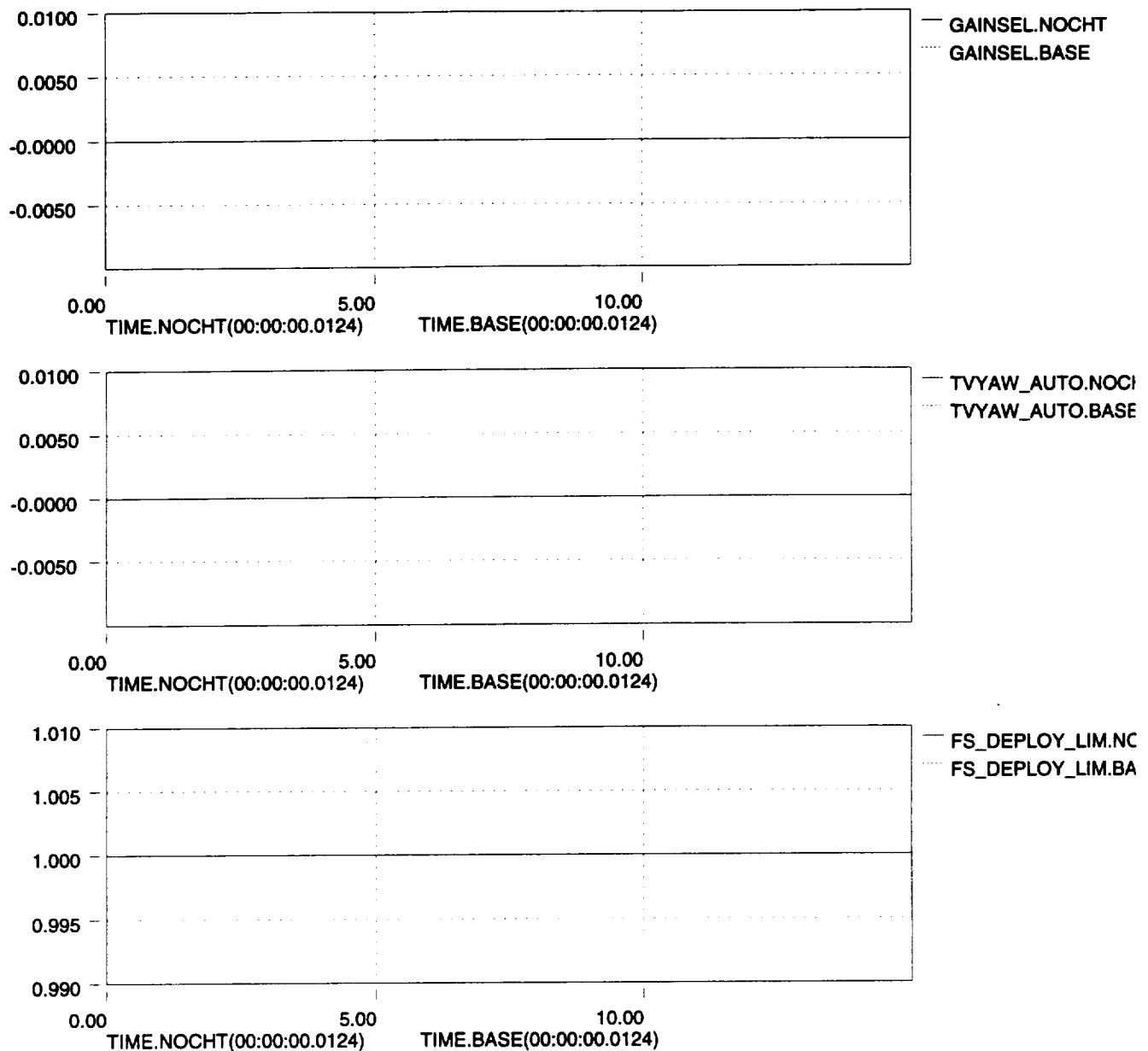
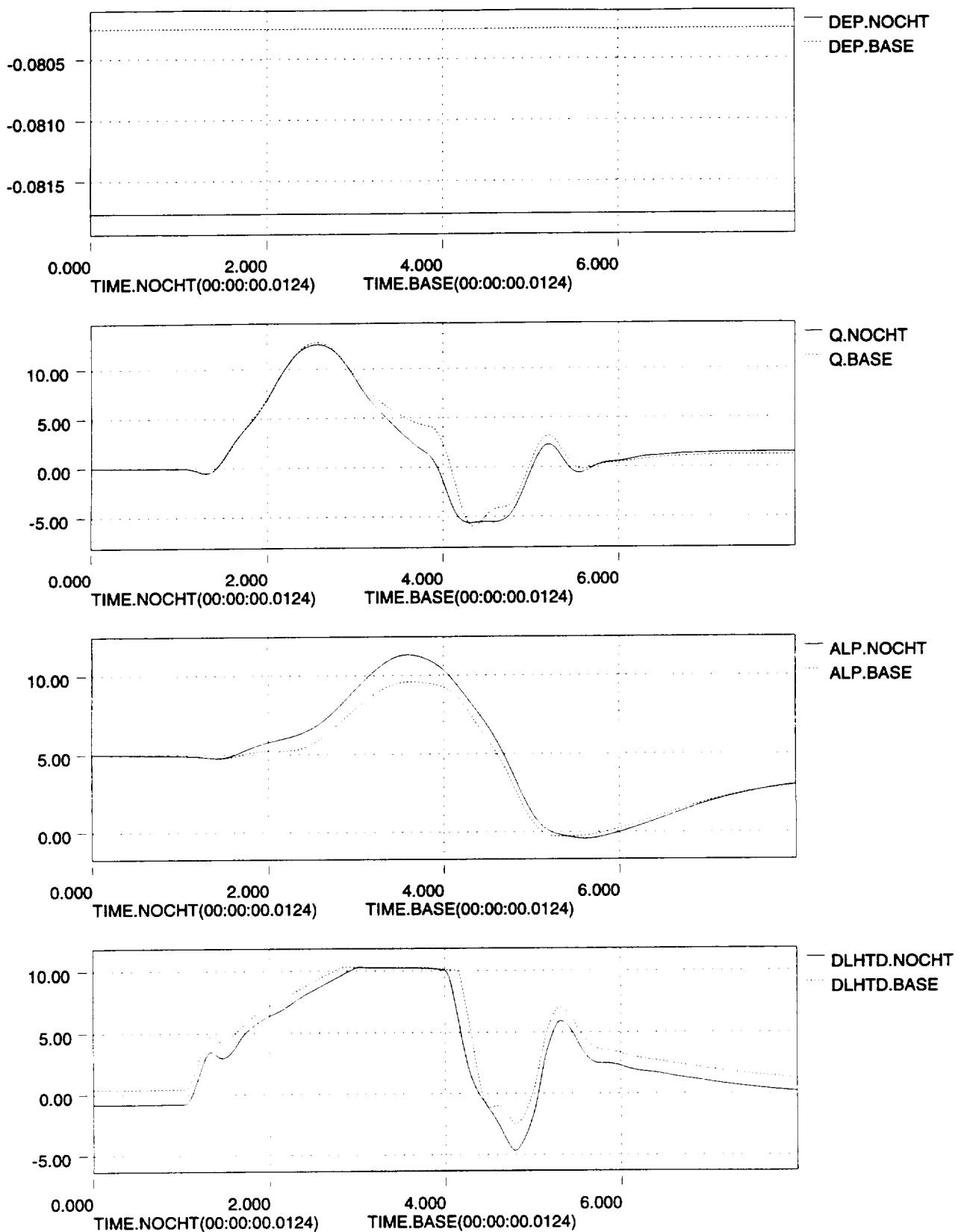
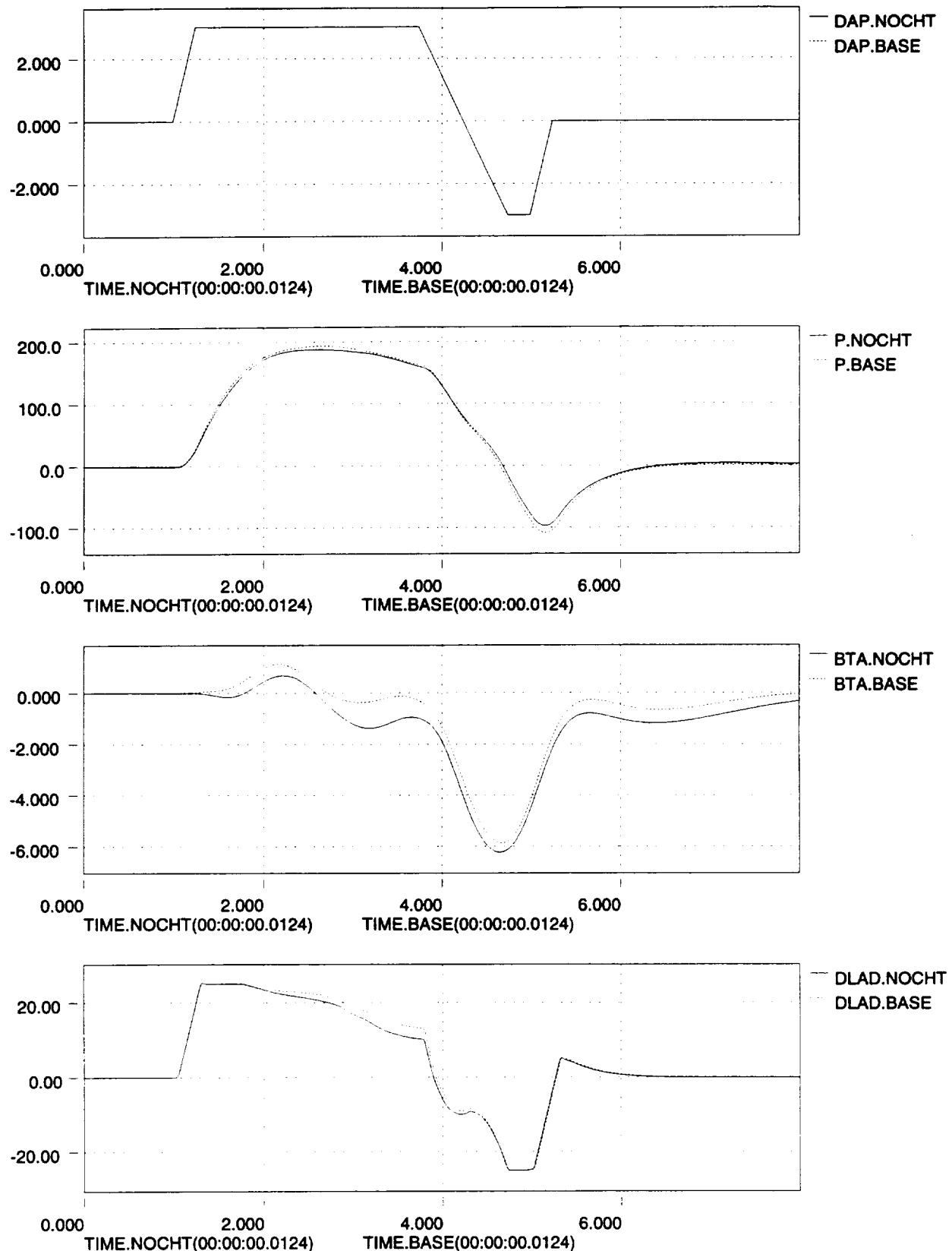


Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 1/12



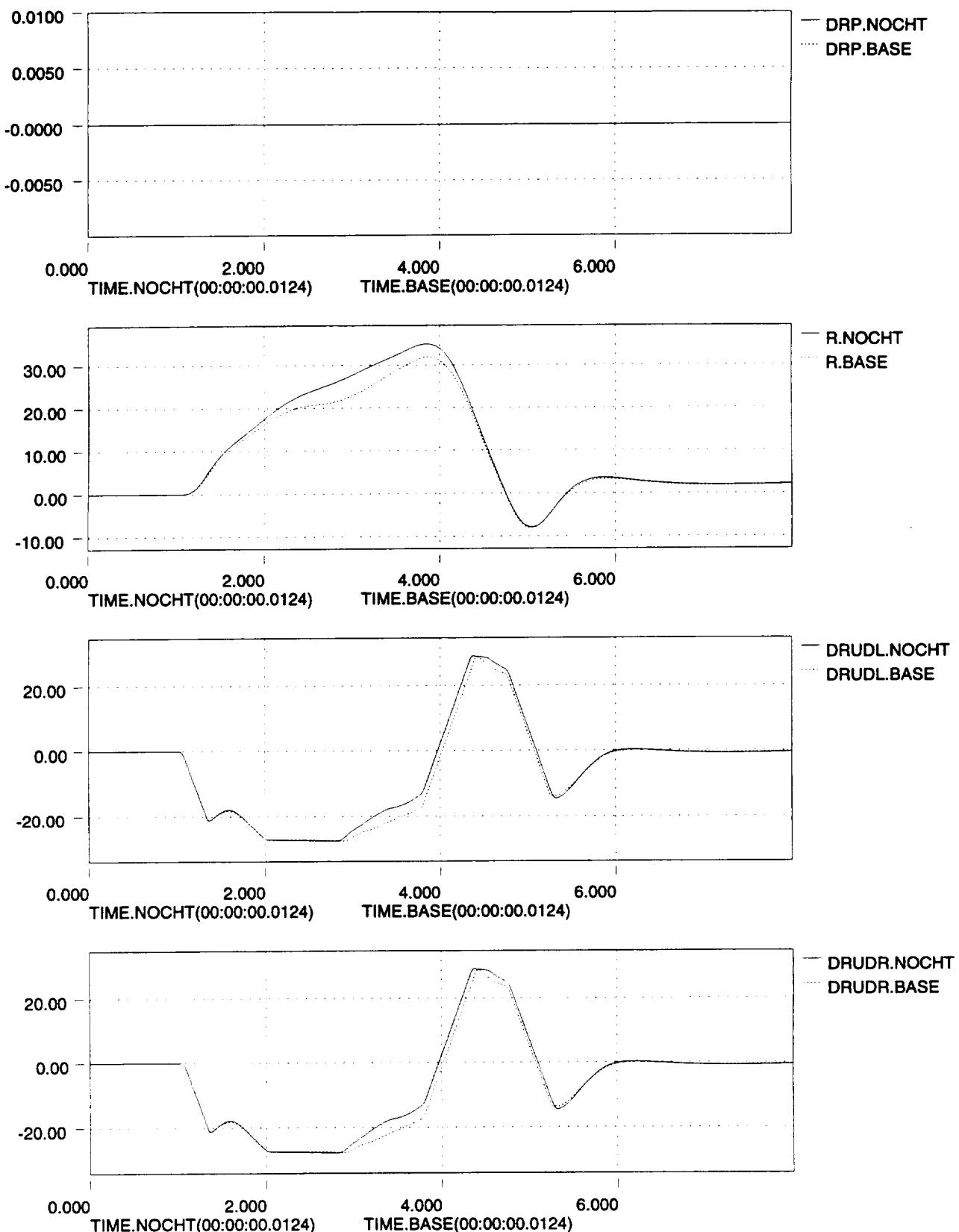
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 2/12



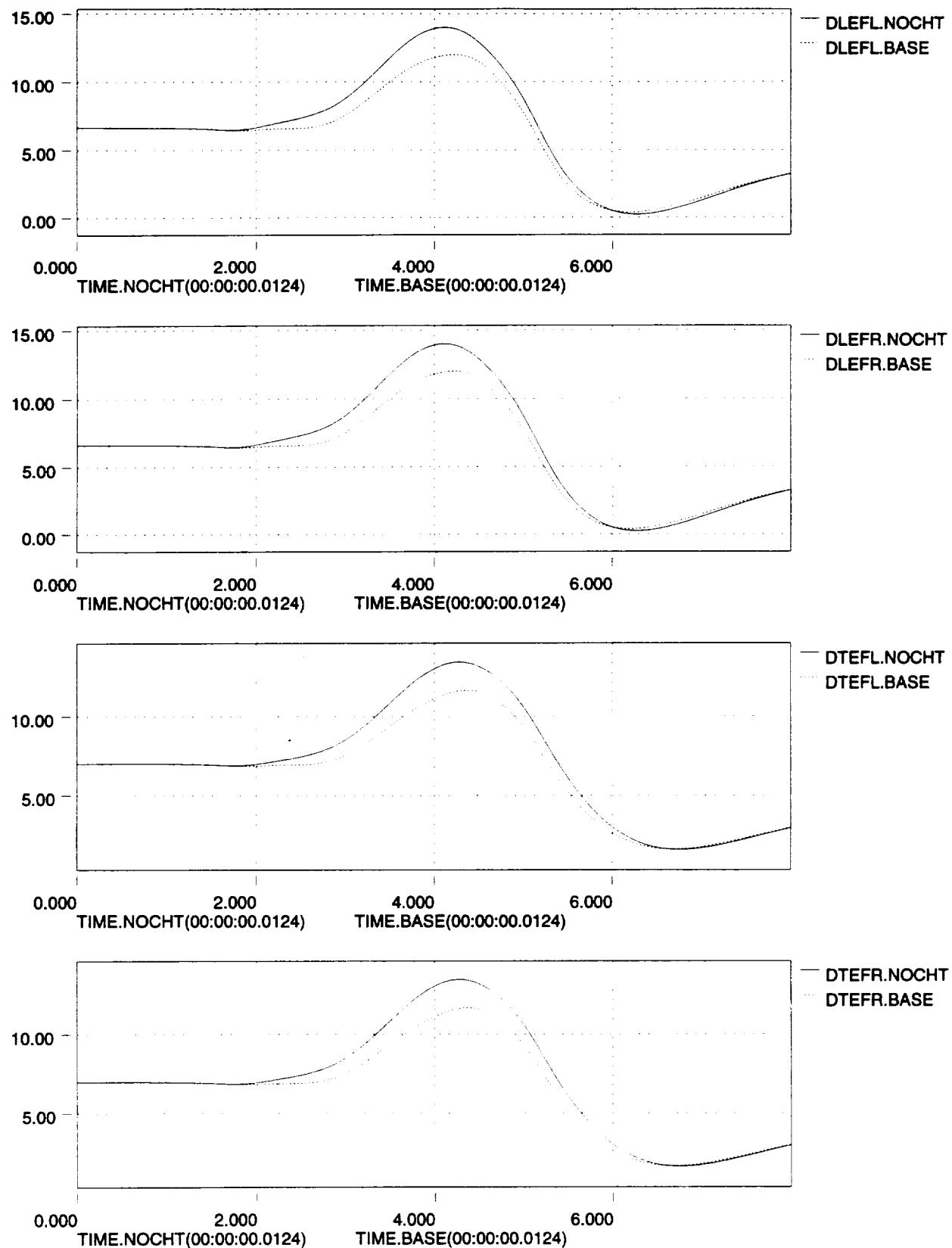
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 3/12



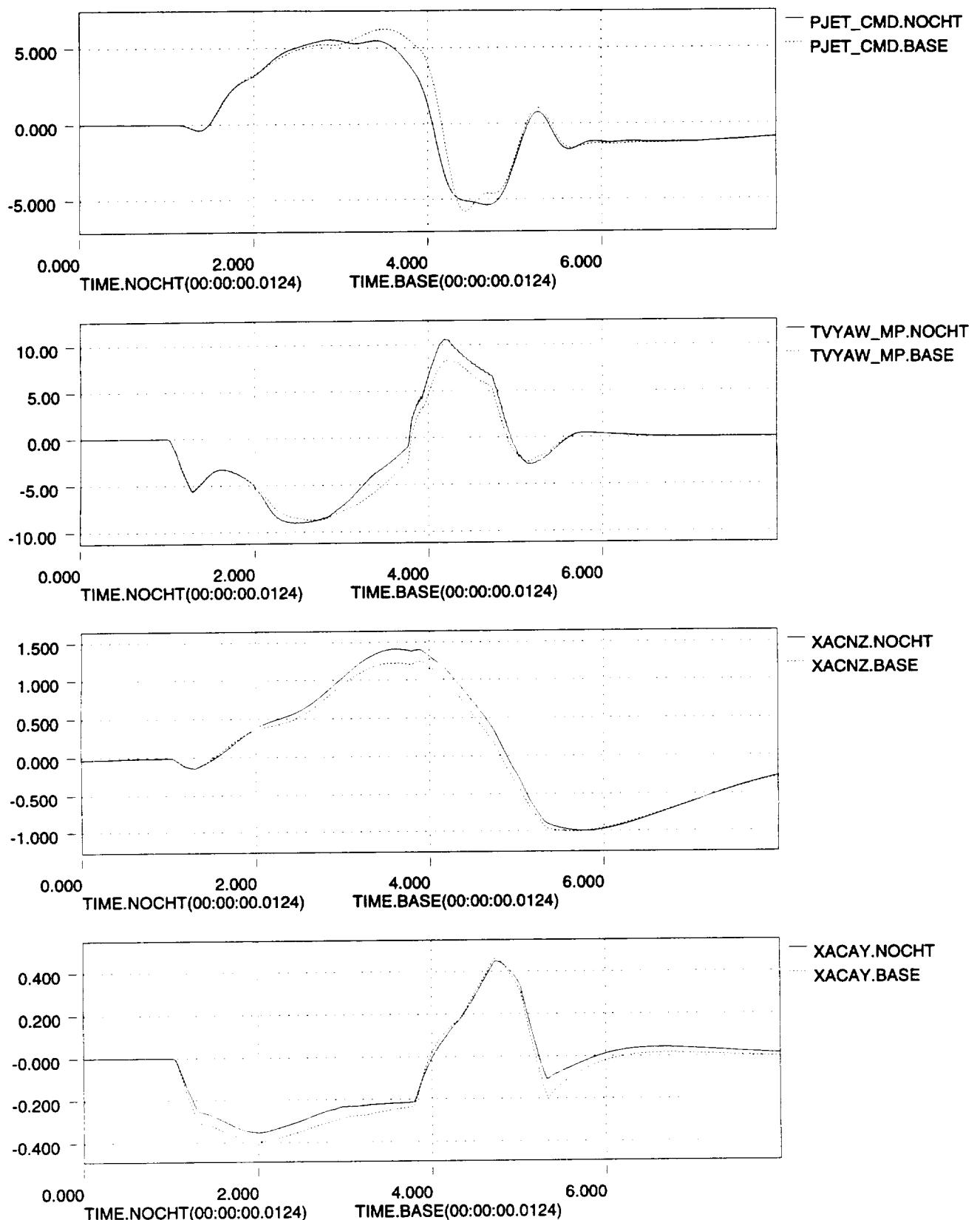
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 4/12



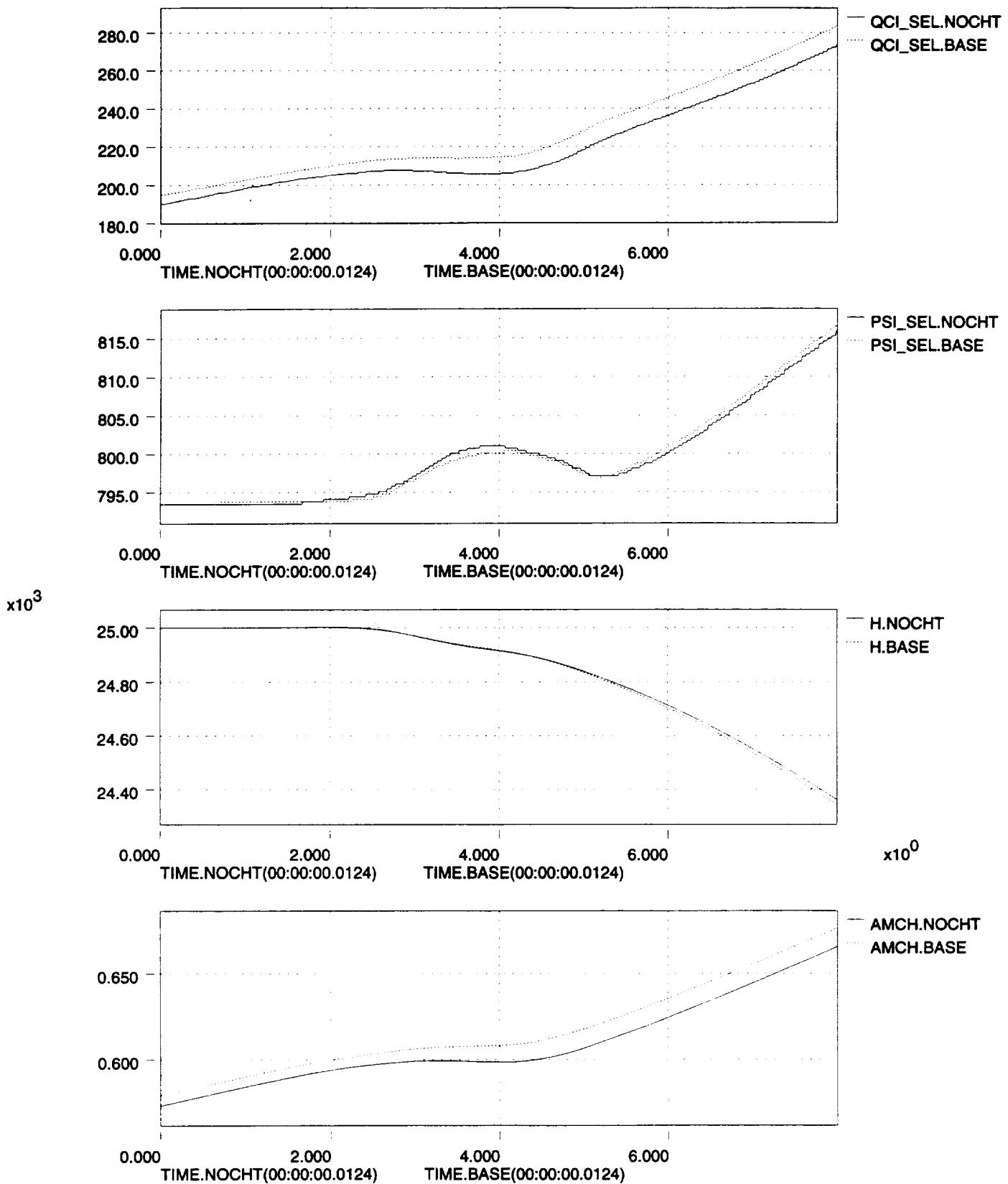
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 5/12



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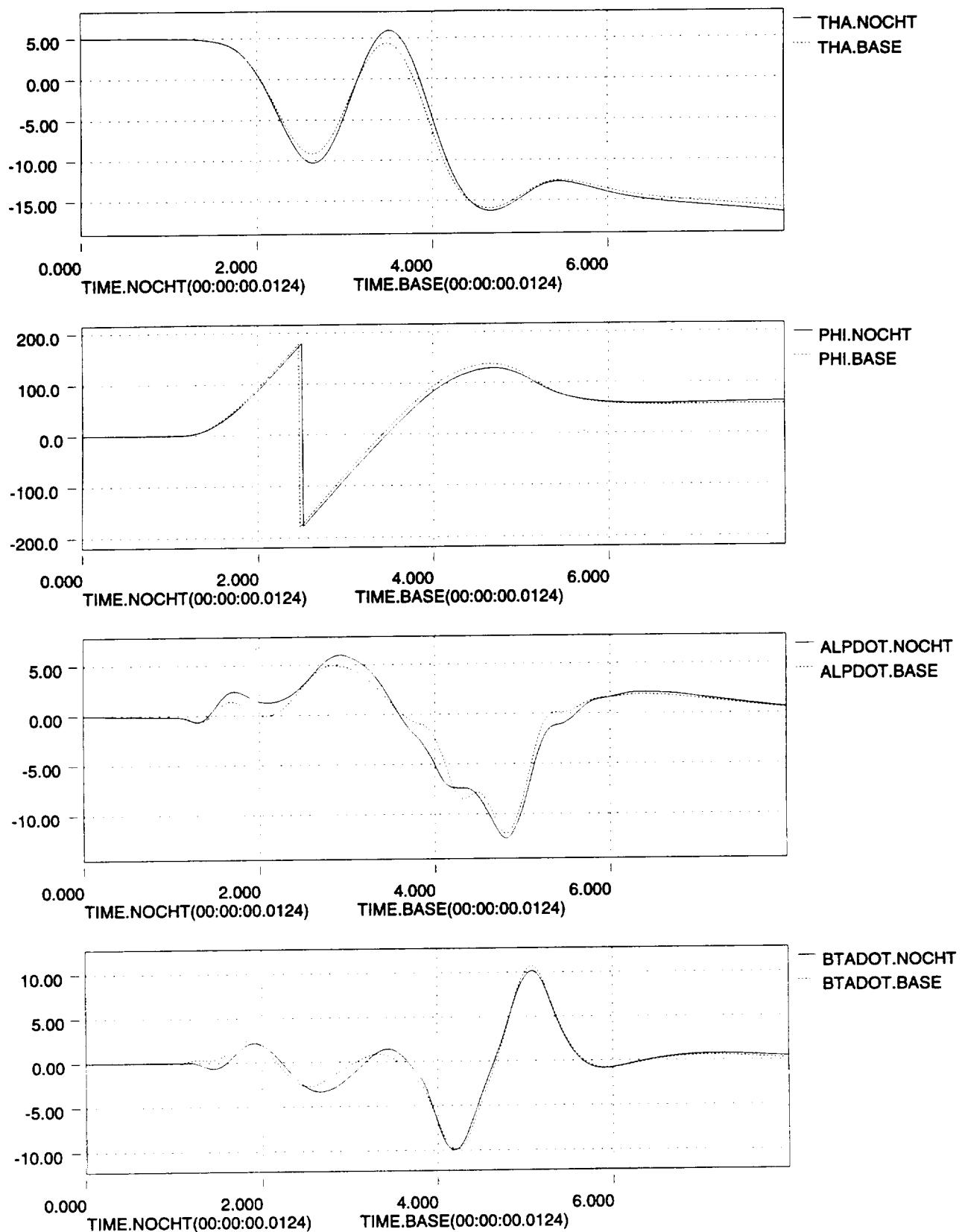
Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 6/12



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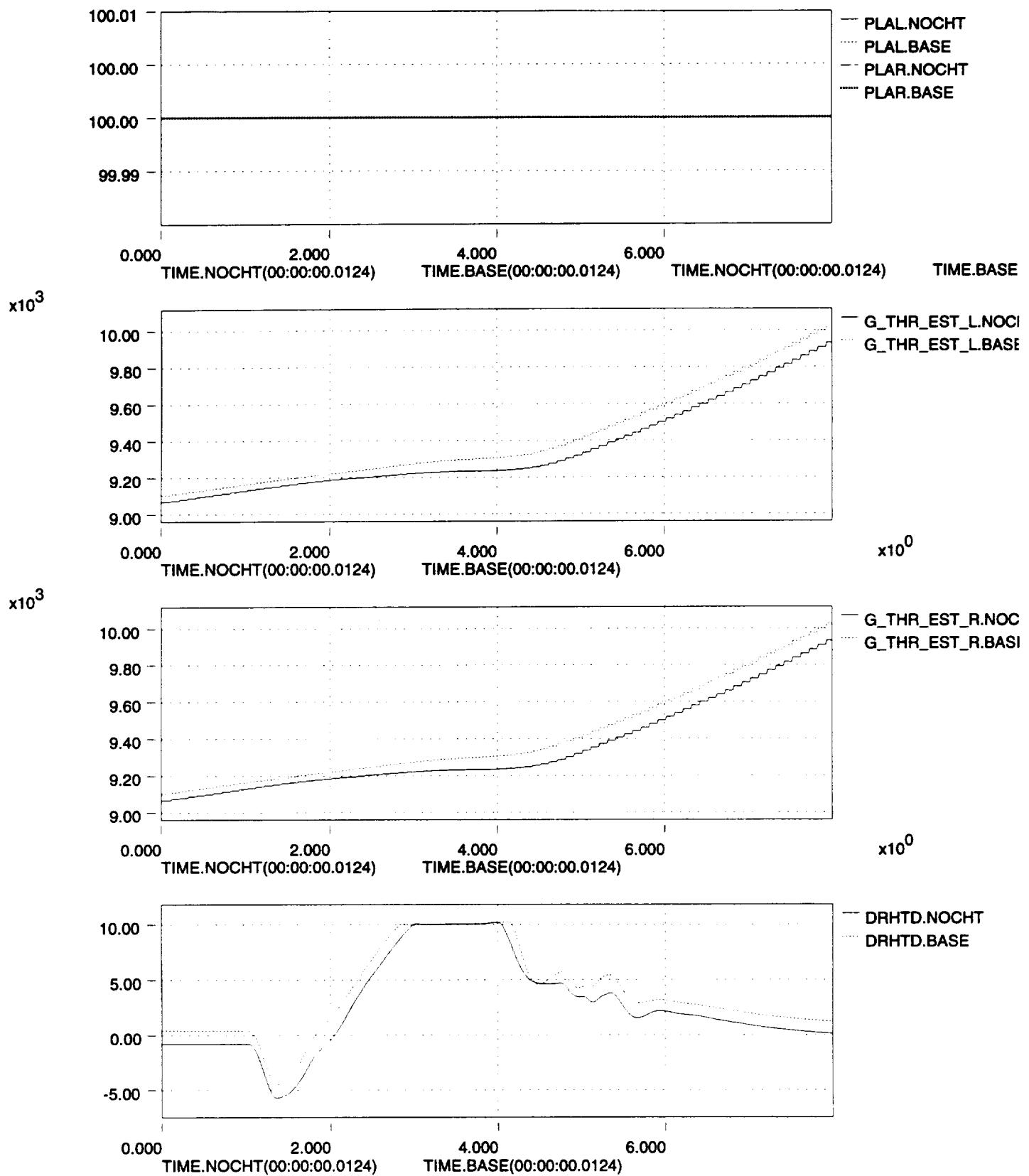
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 7/12



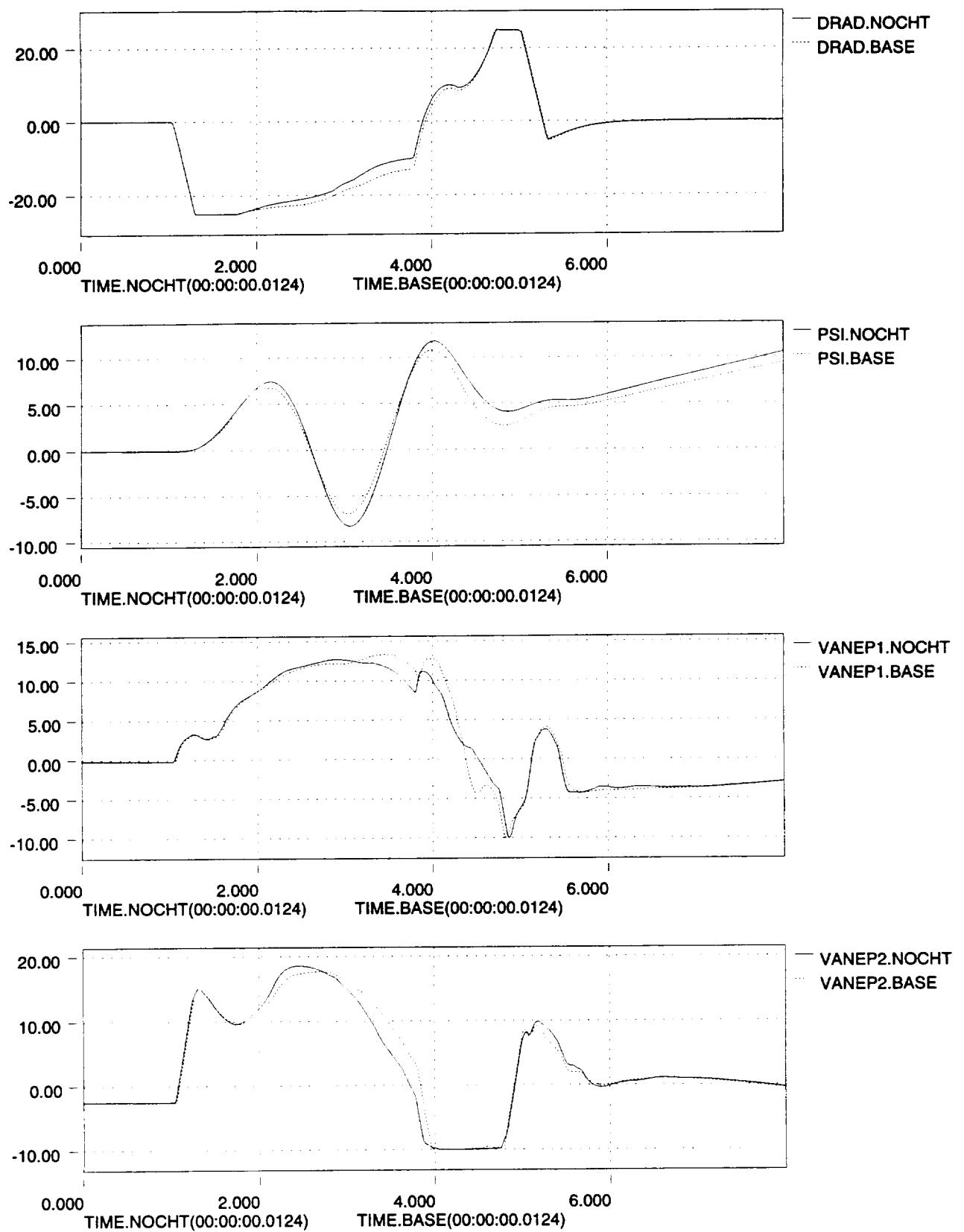
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 8/12



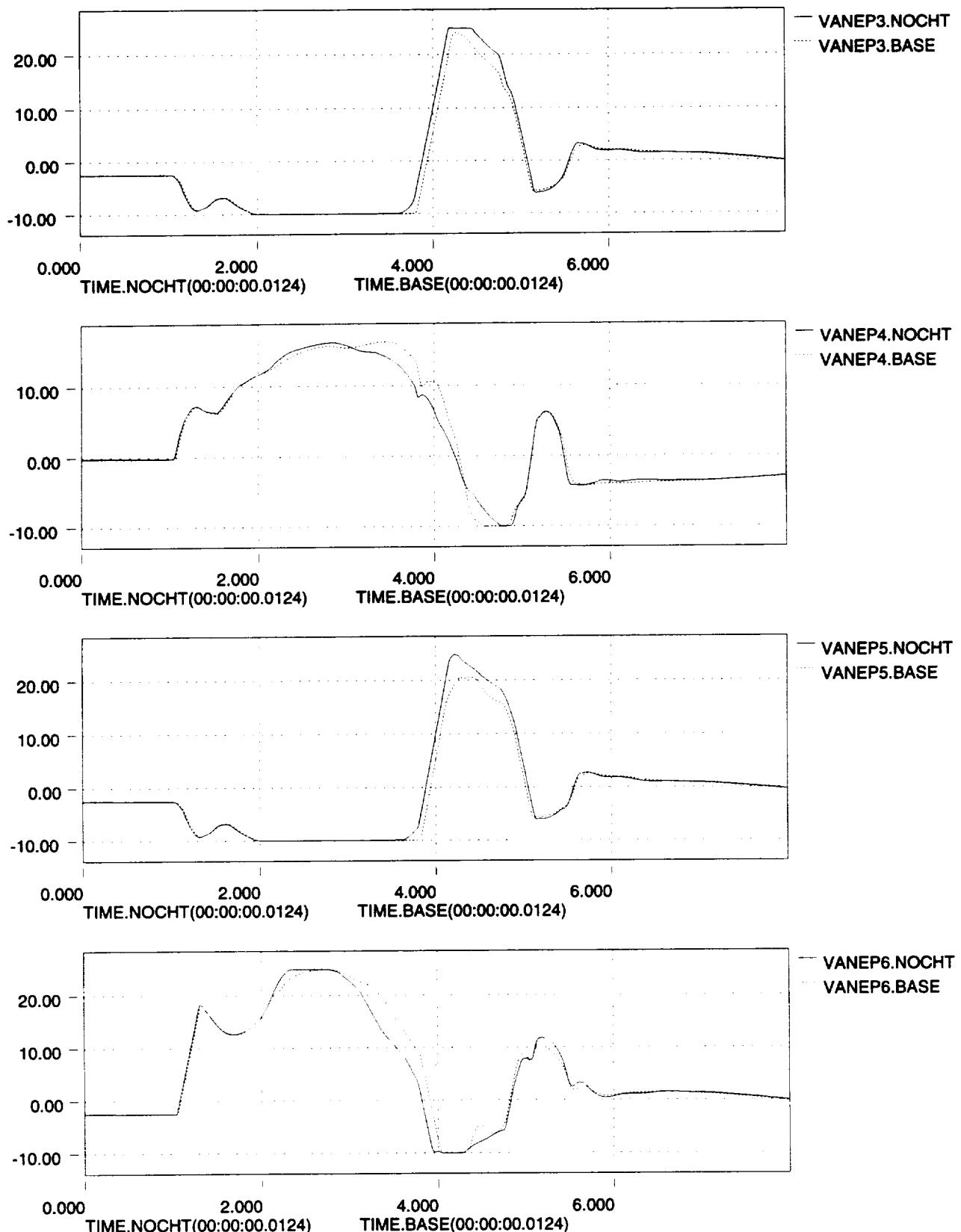
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 9/12



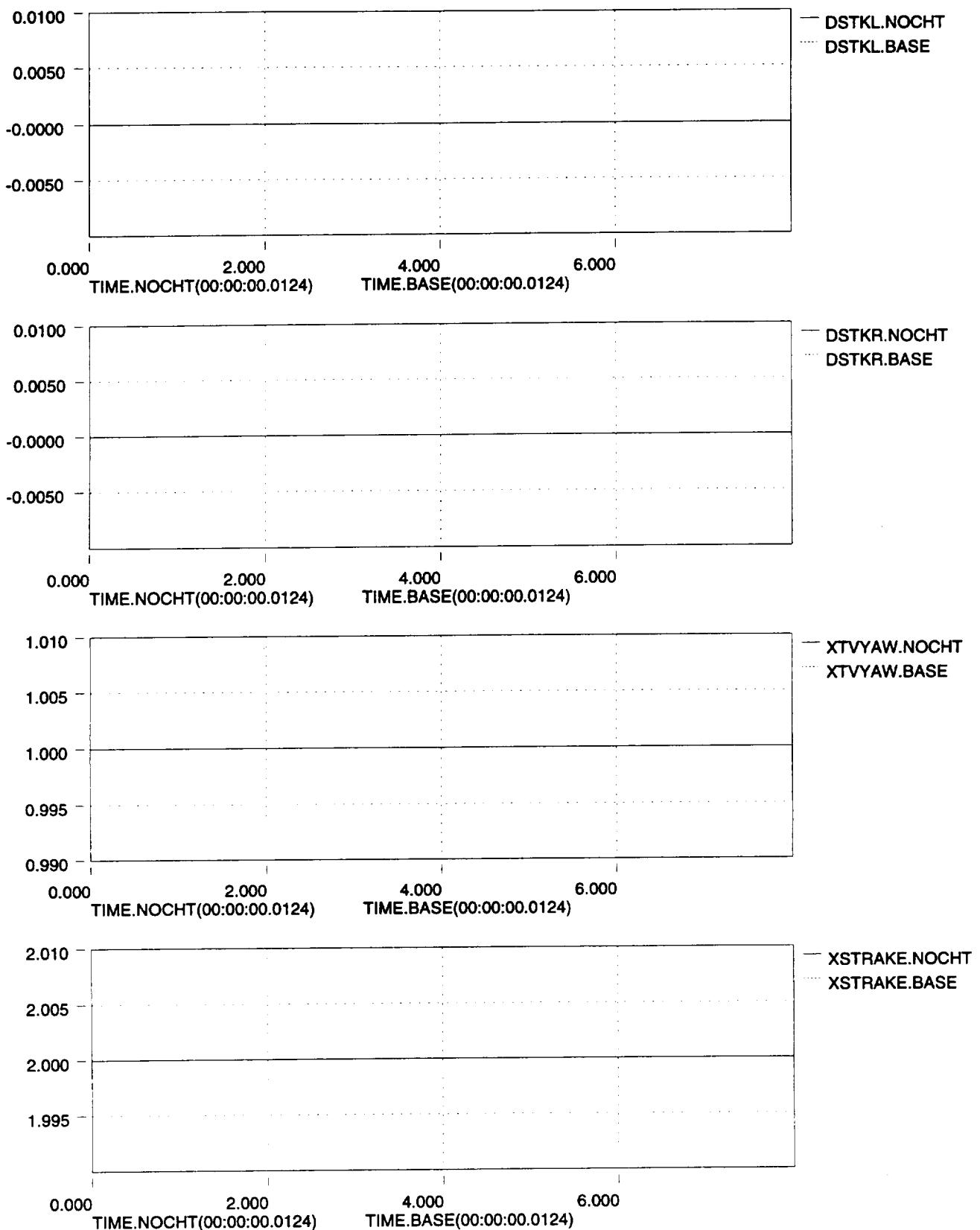
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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 10/12



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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 11/12



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Figure 5 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_5_deg_AOA-25k_trim_Max_AB_360_deg_roll page 12/12

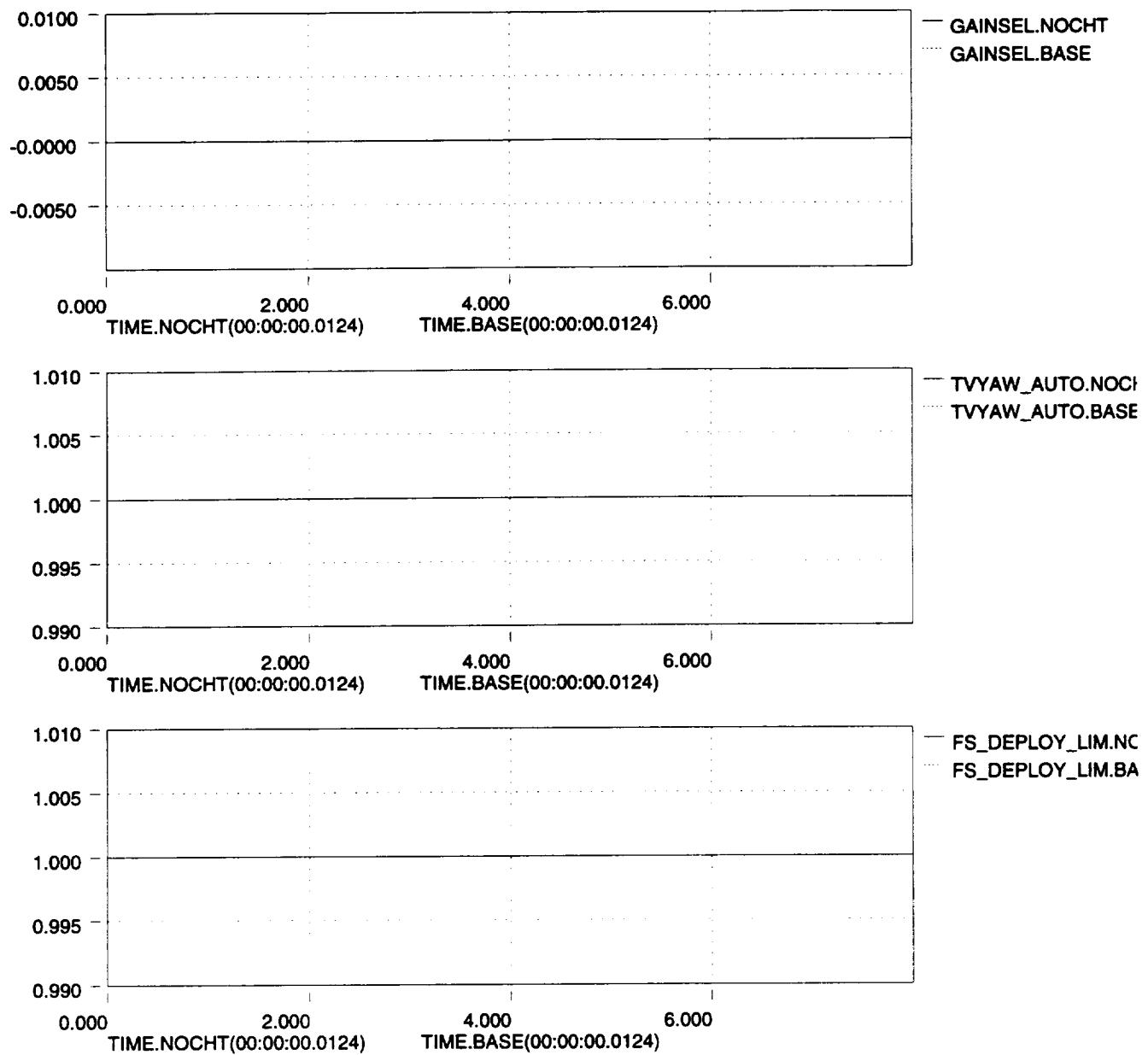
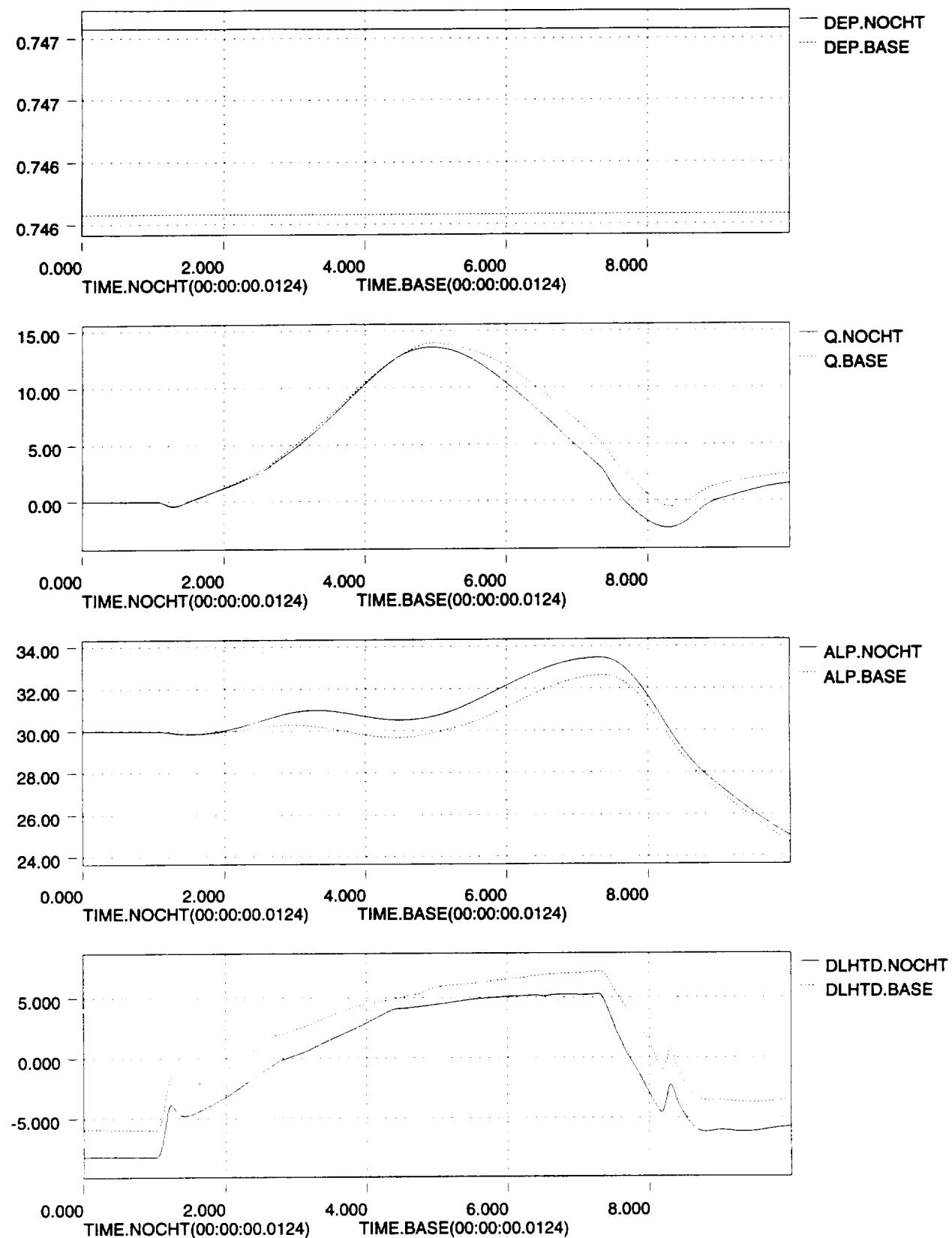
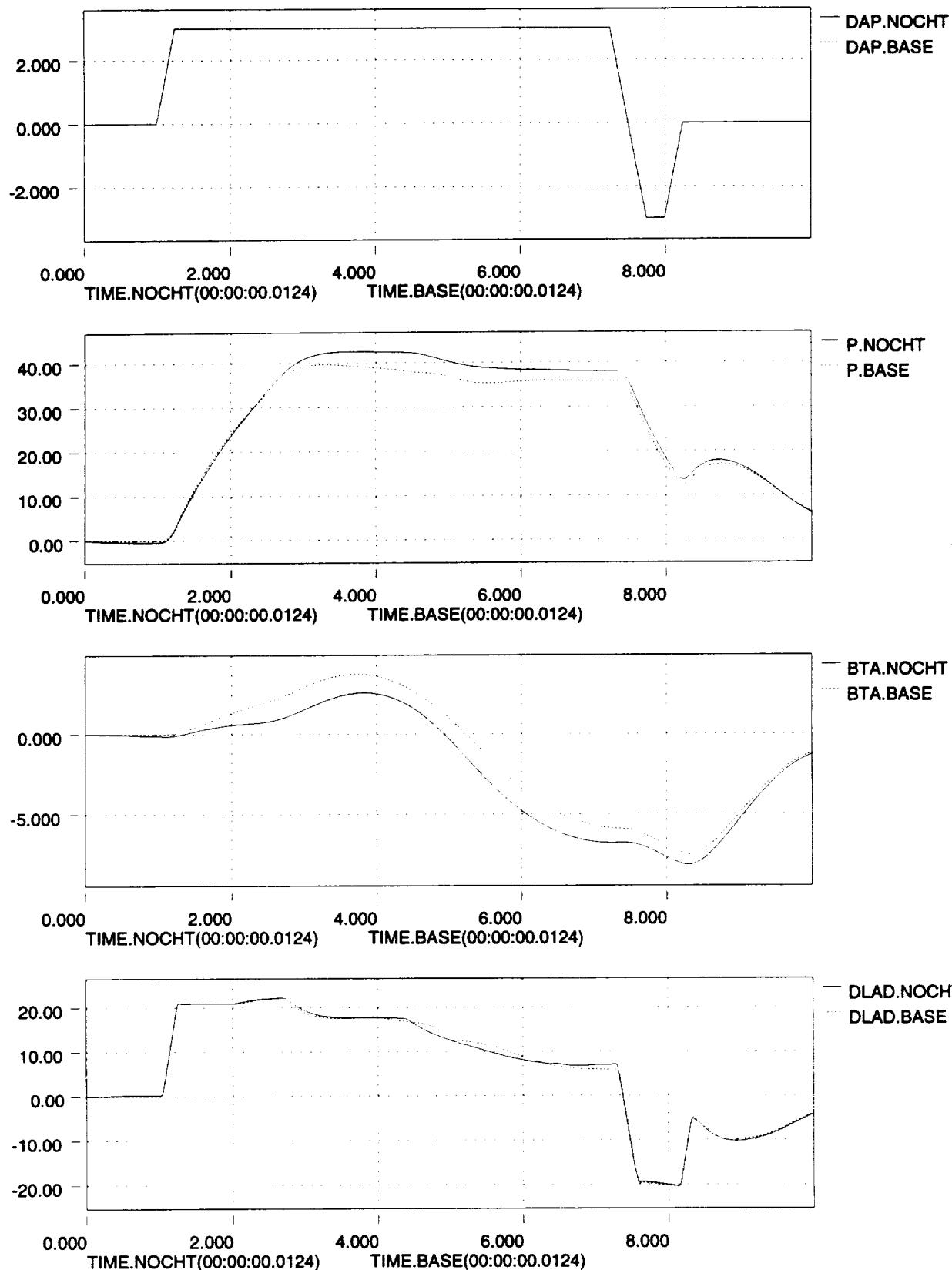


Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
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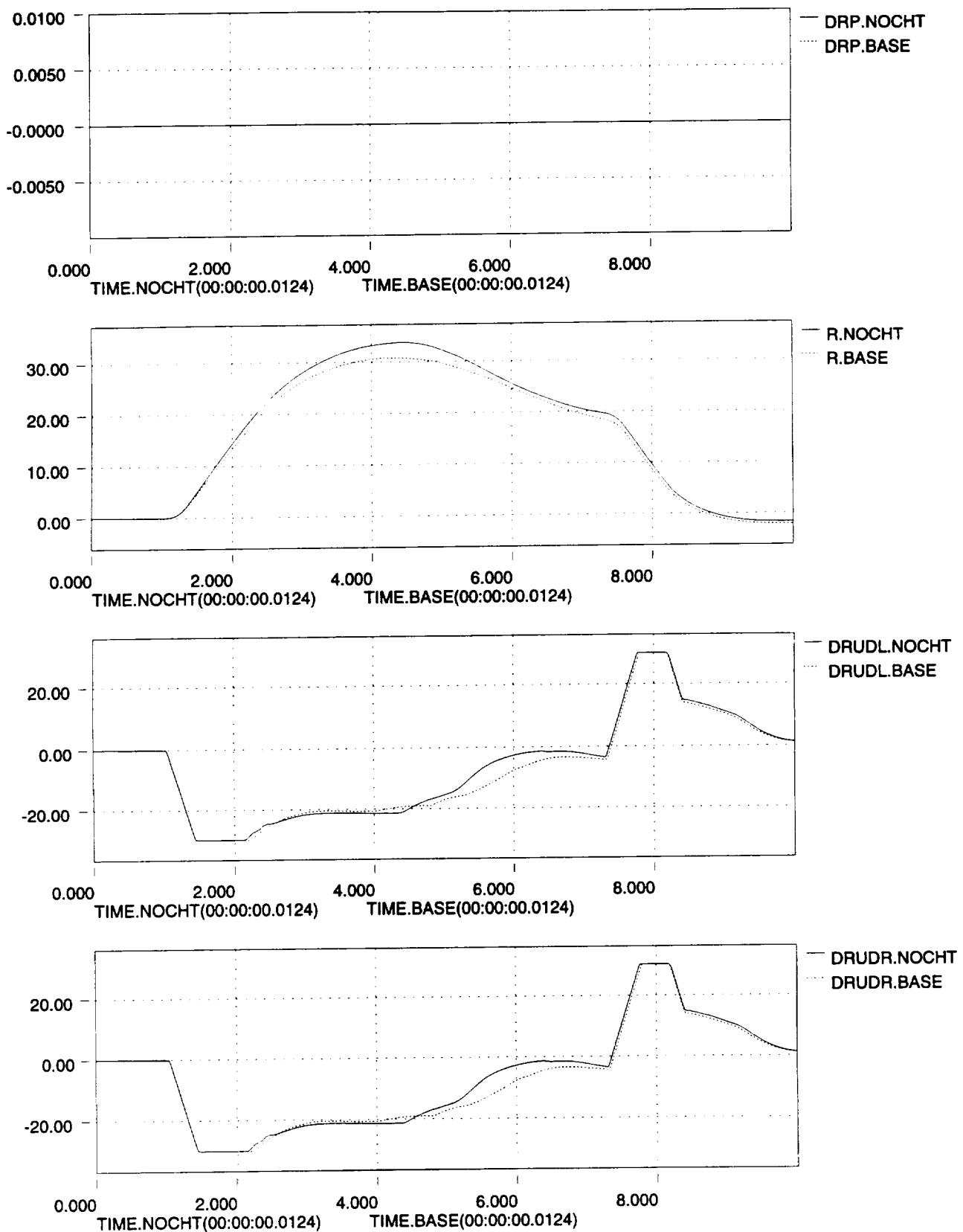
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
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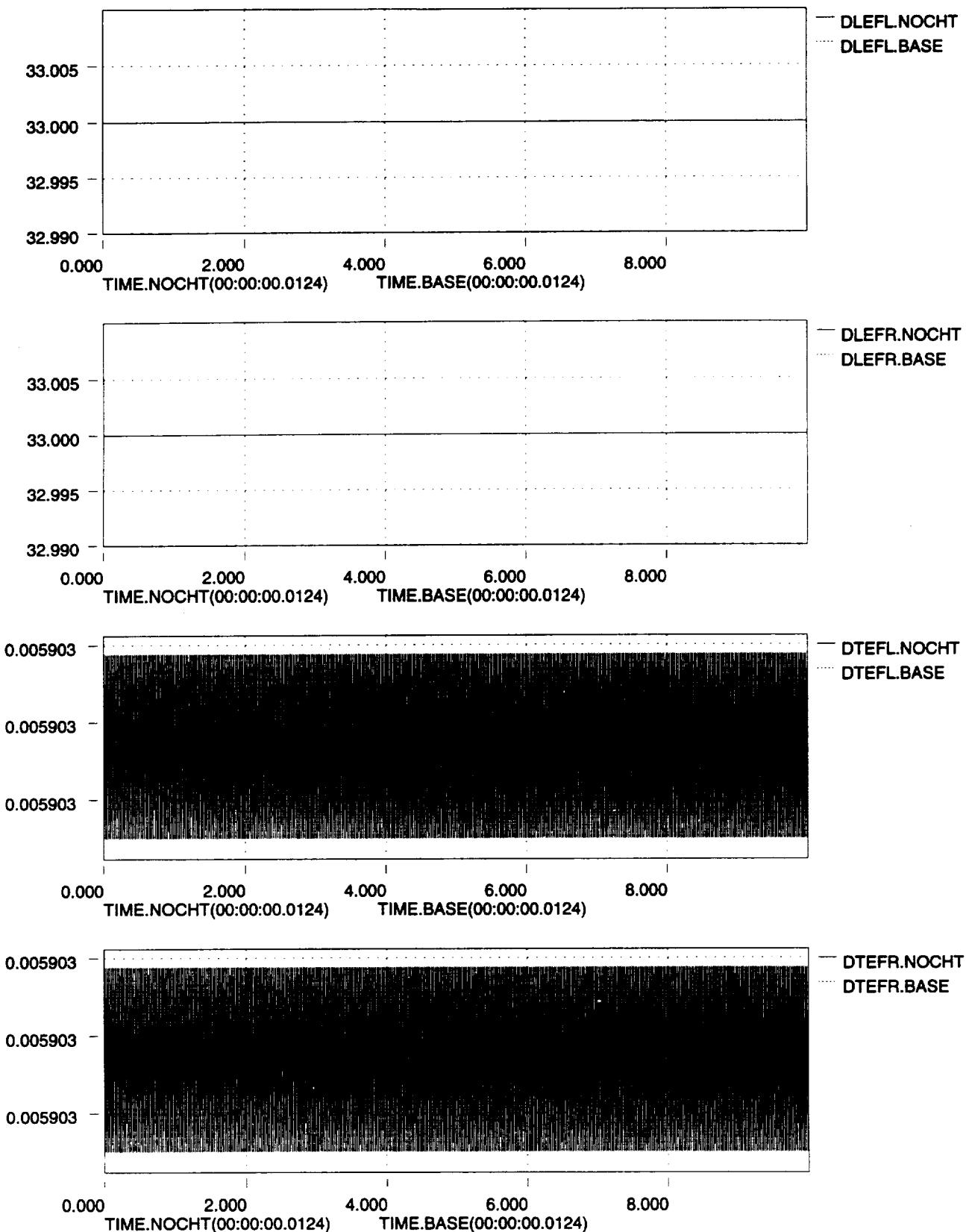
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
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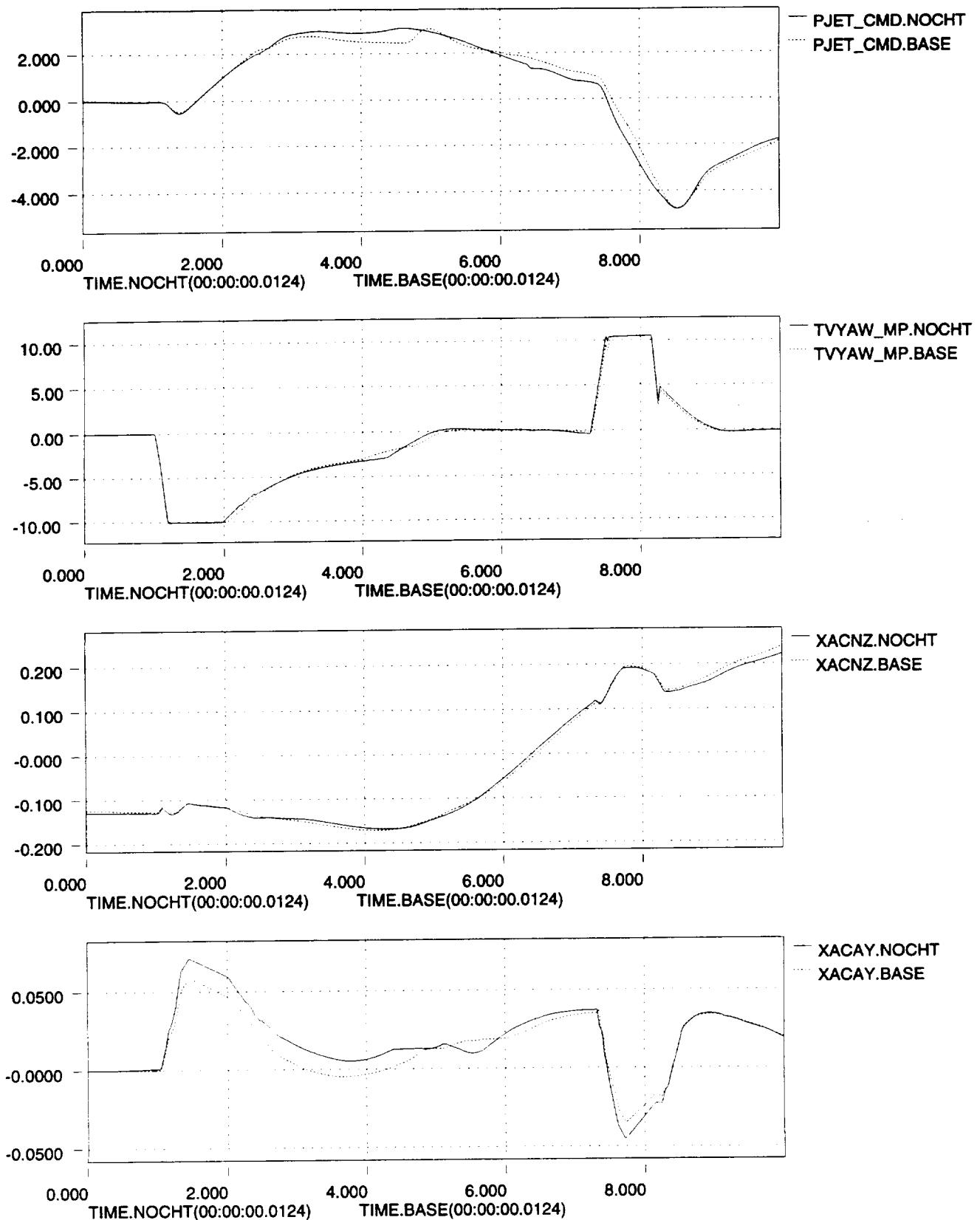
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
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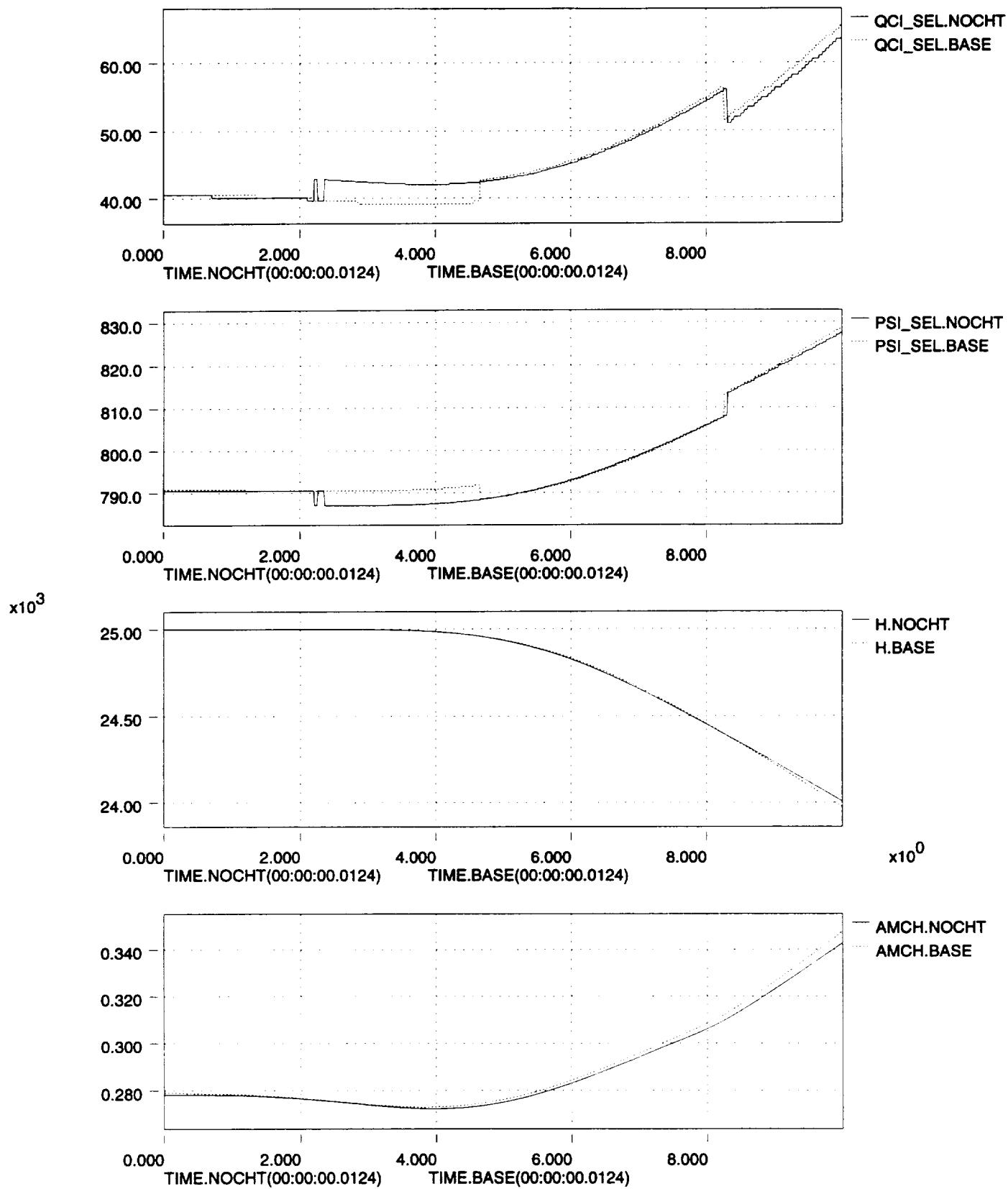
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 5/12



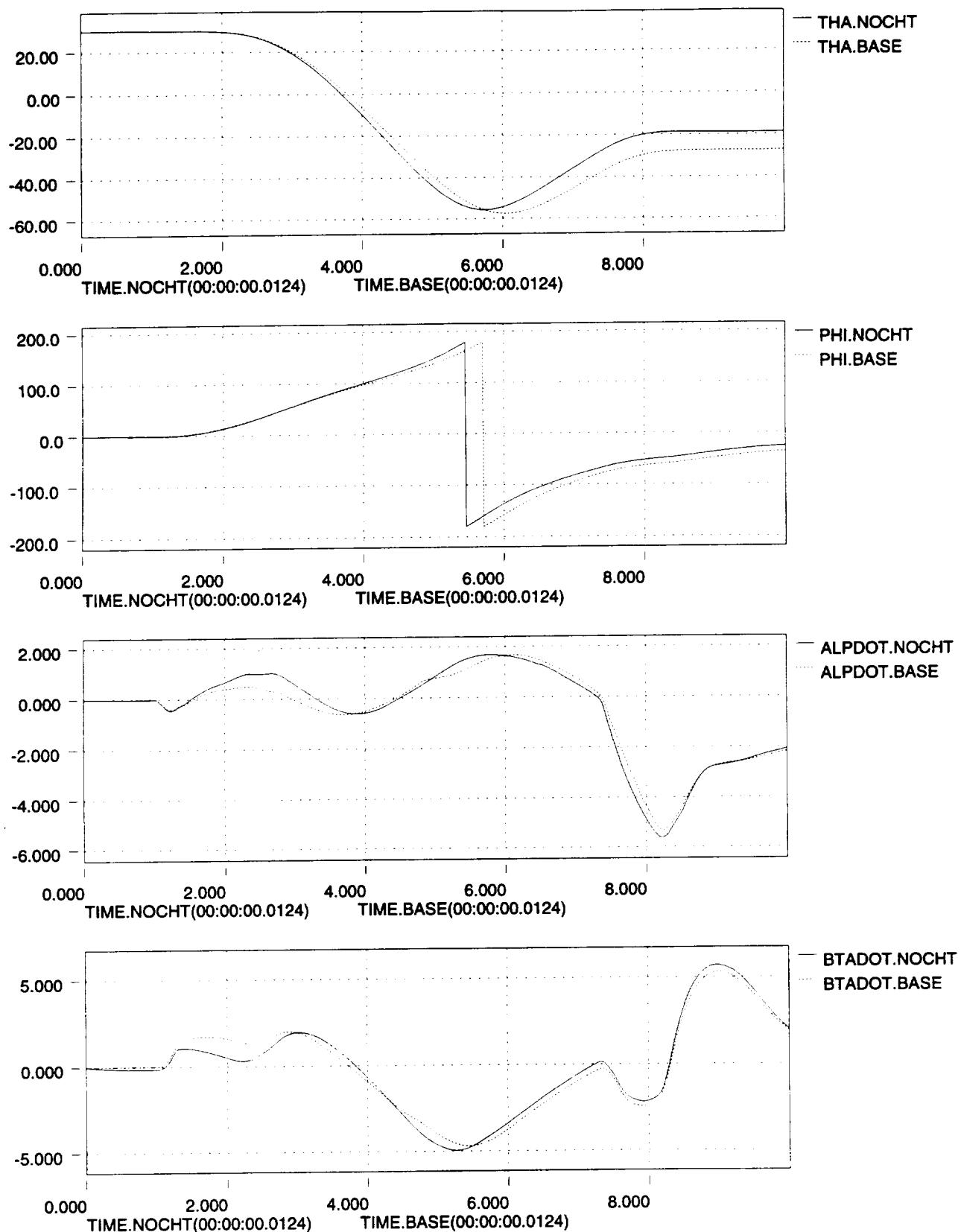
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 6/12



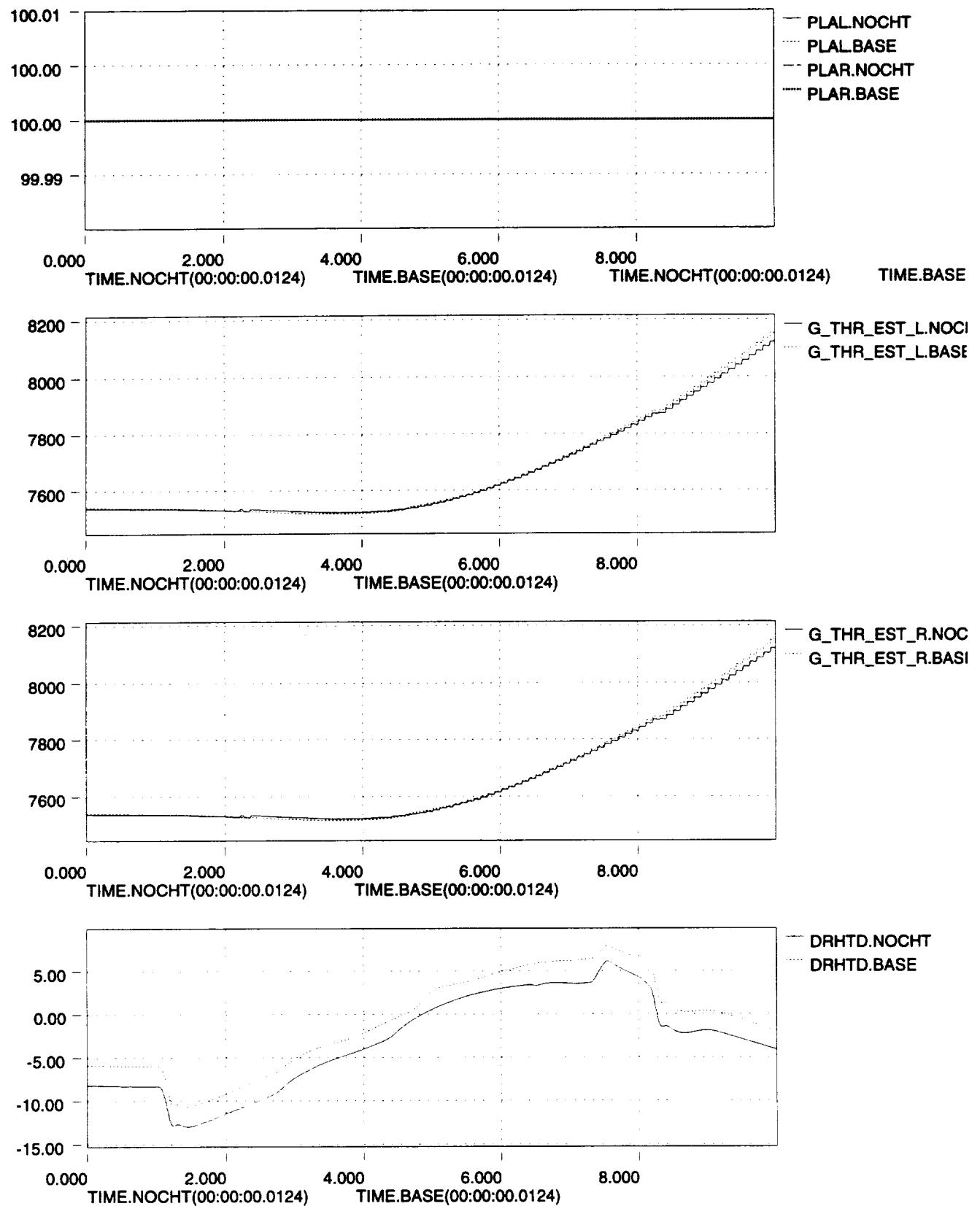
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 7/12



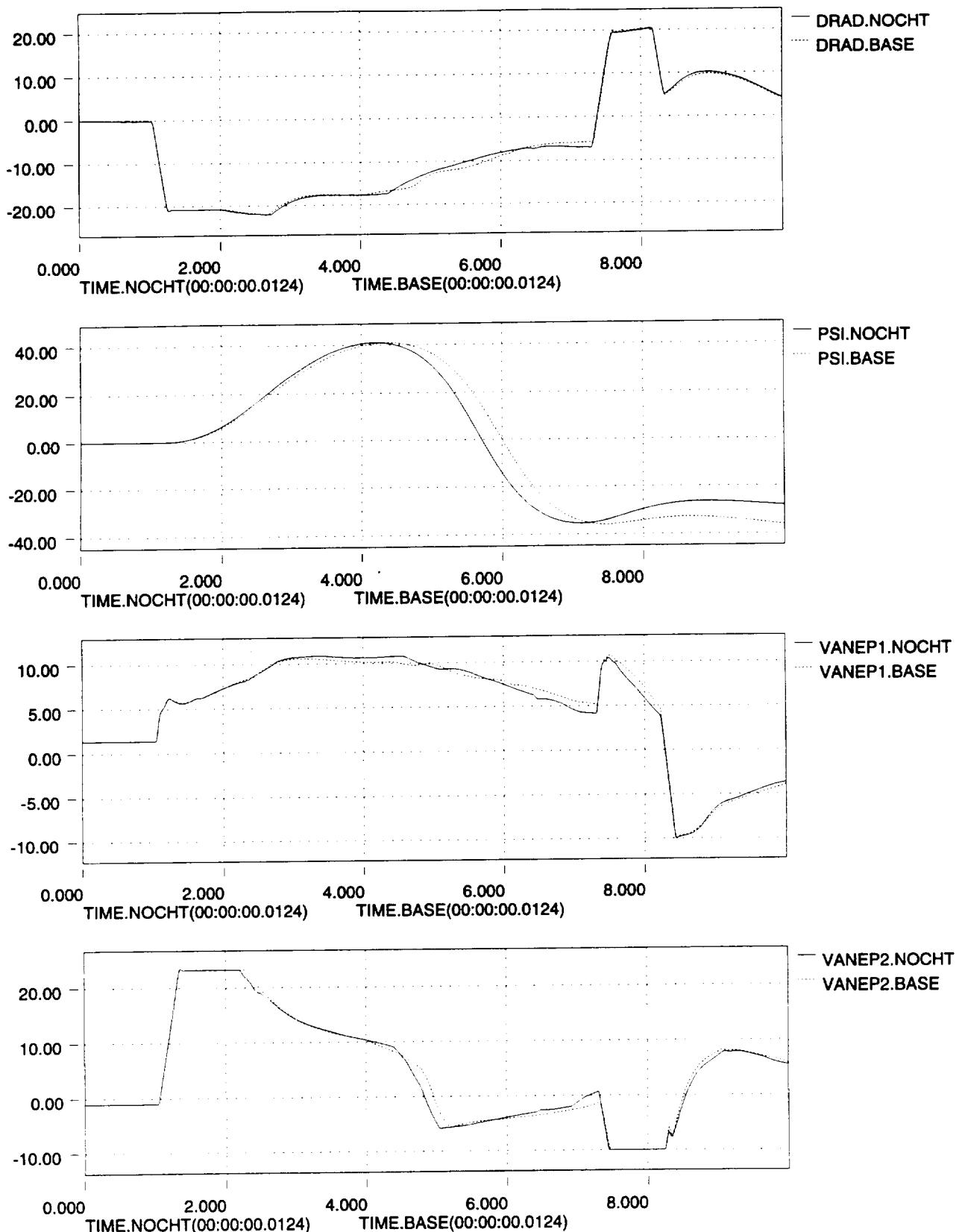
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 8/12



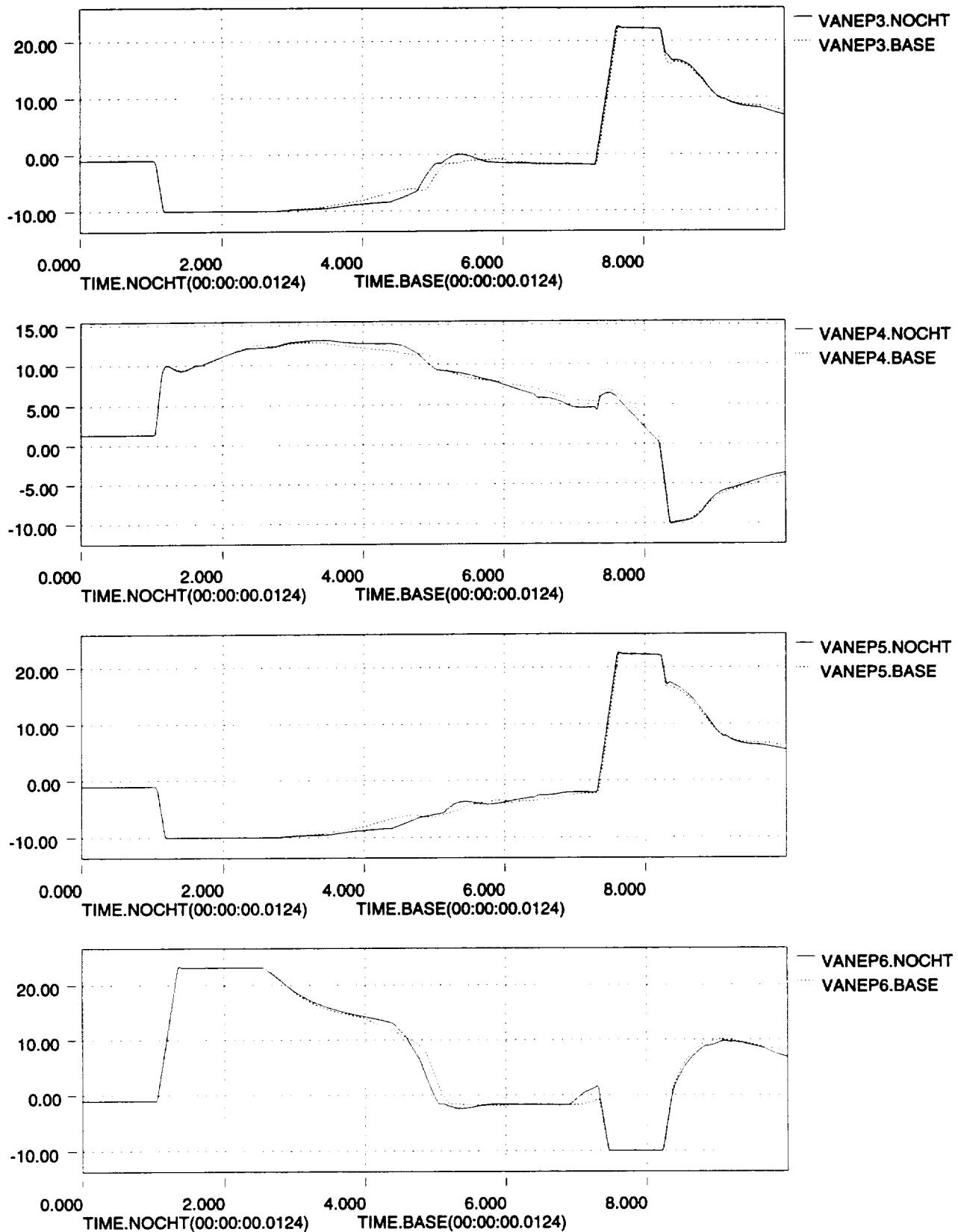
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 9/12



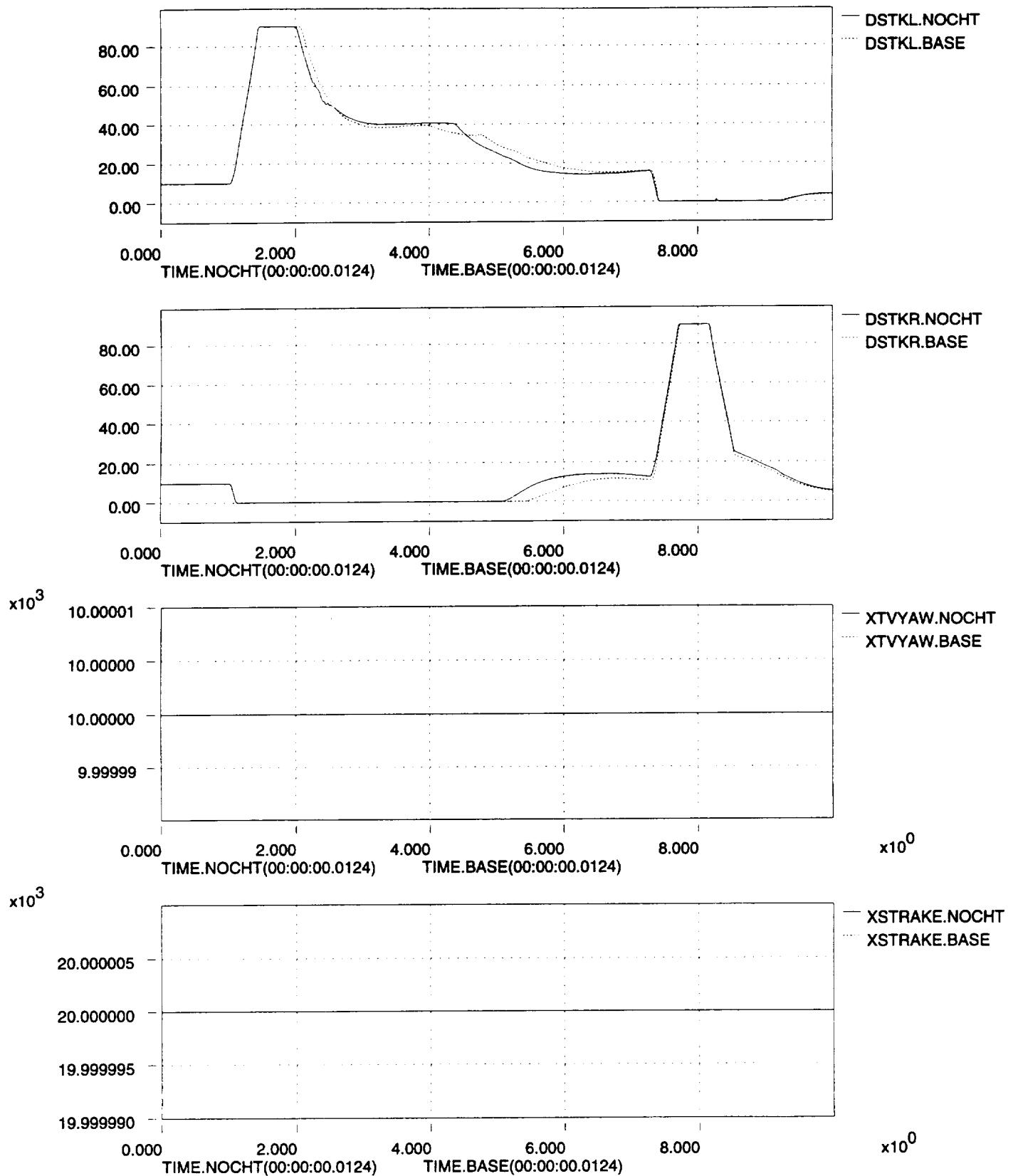
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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 10/12



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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 11/12



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Figure 6 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_30_deg_AOA-25k_trim_Max_AB_360_deg_roll page 12/12

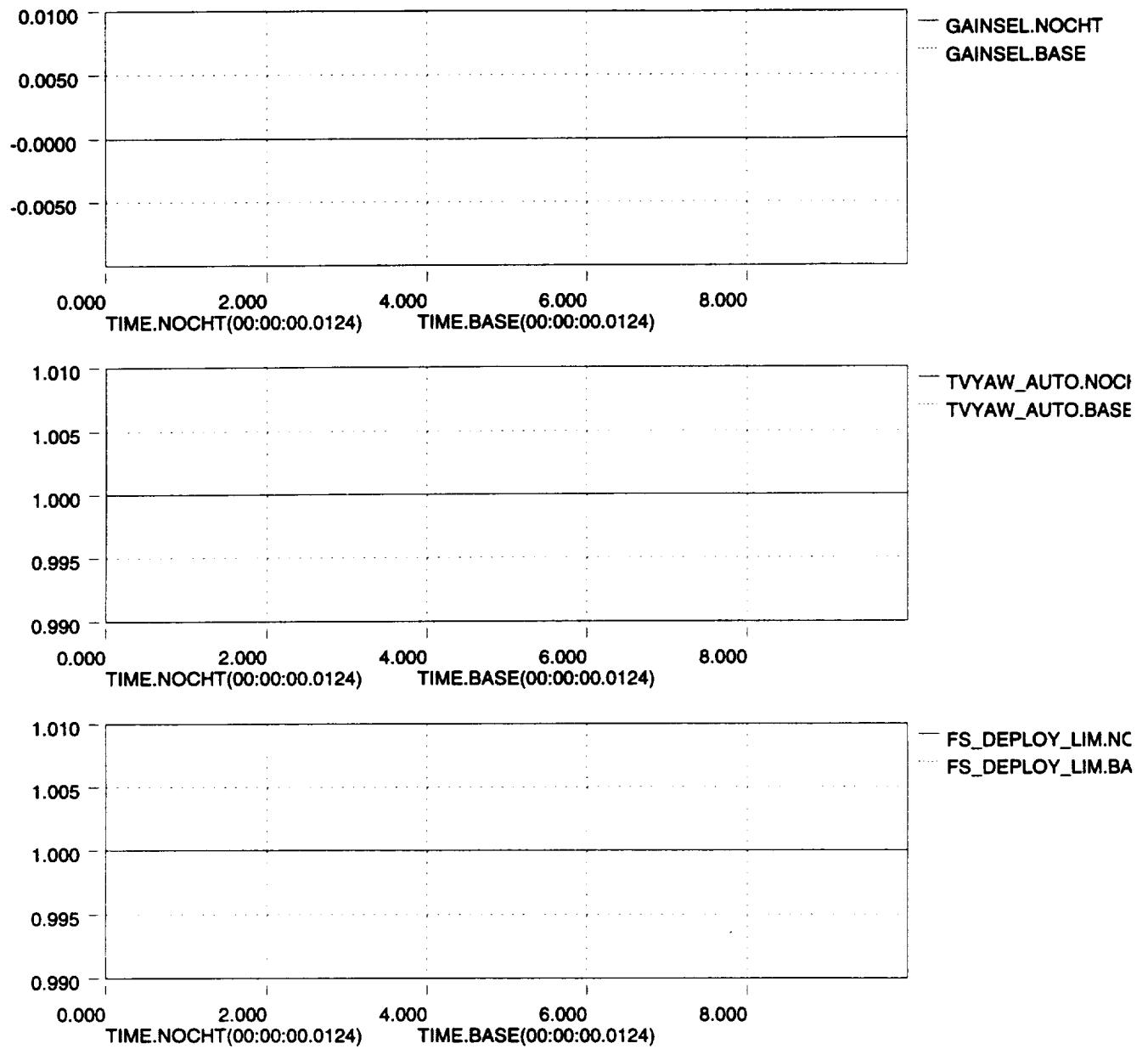
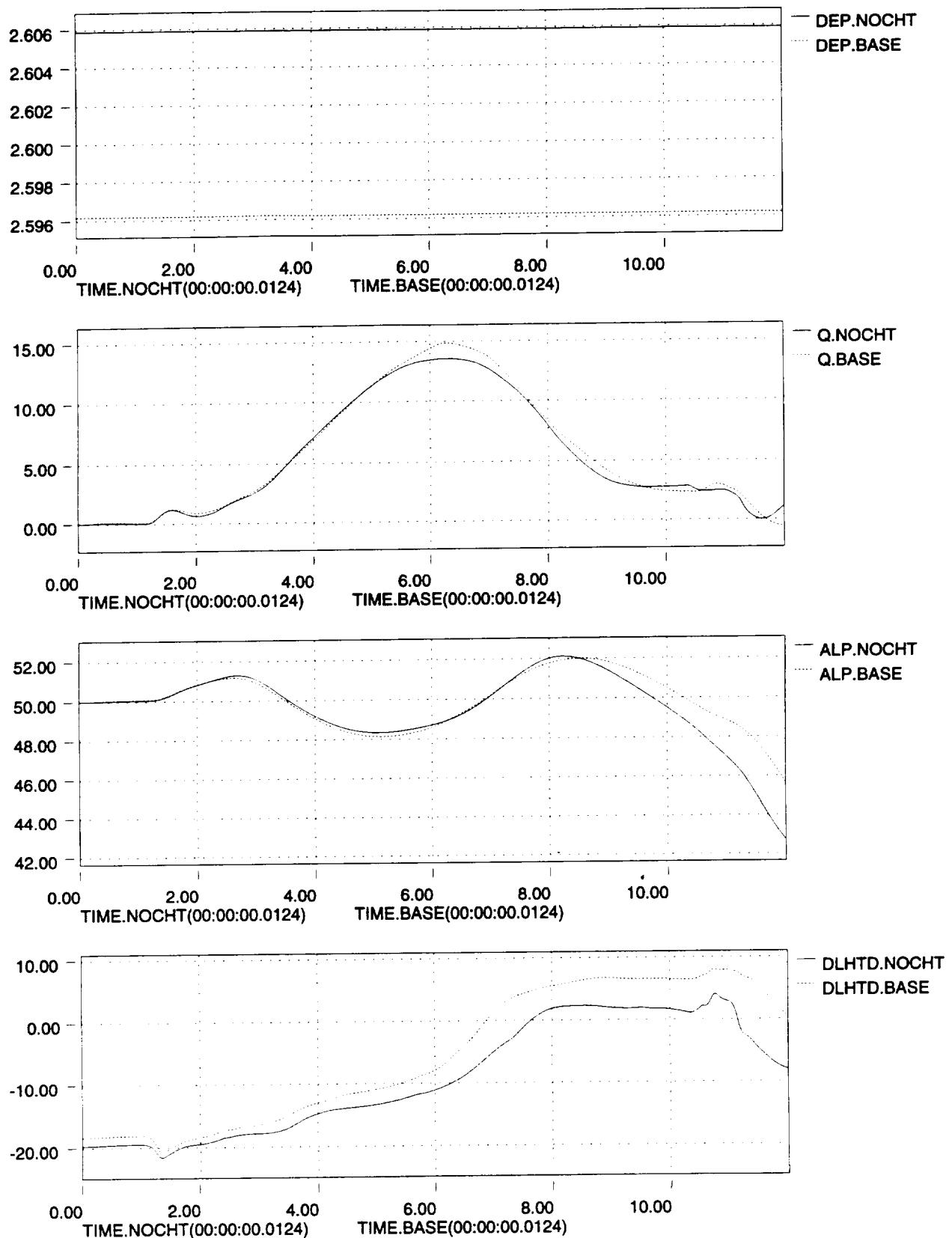
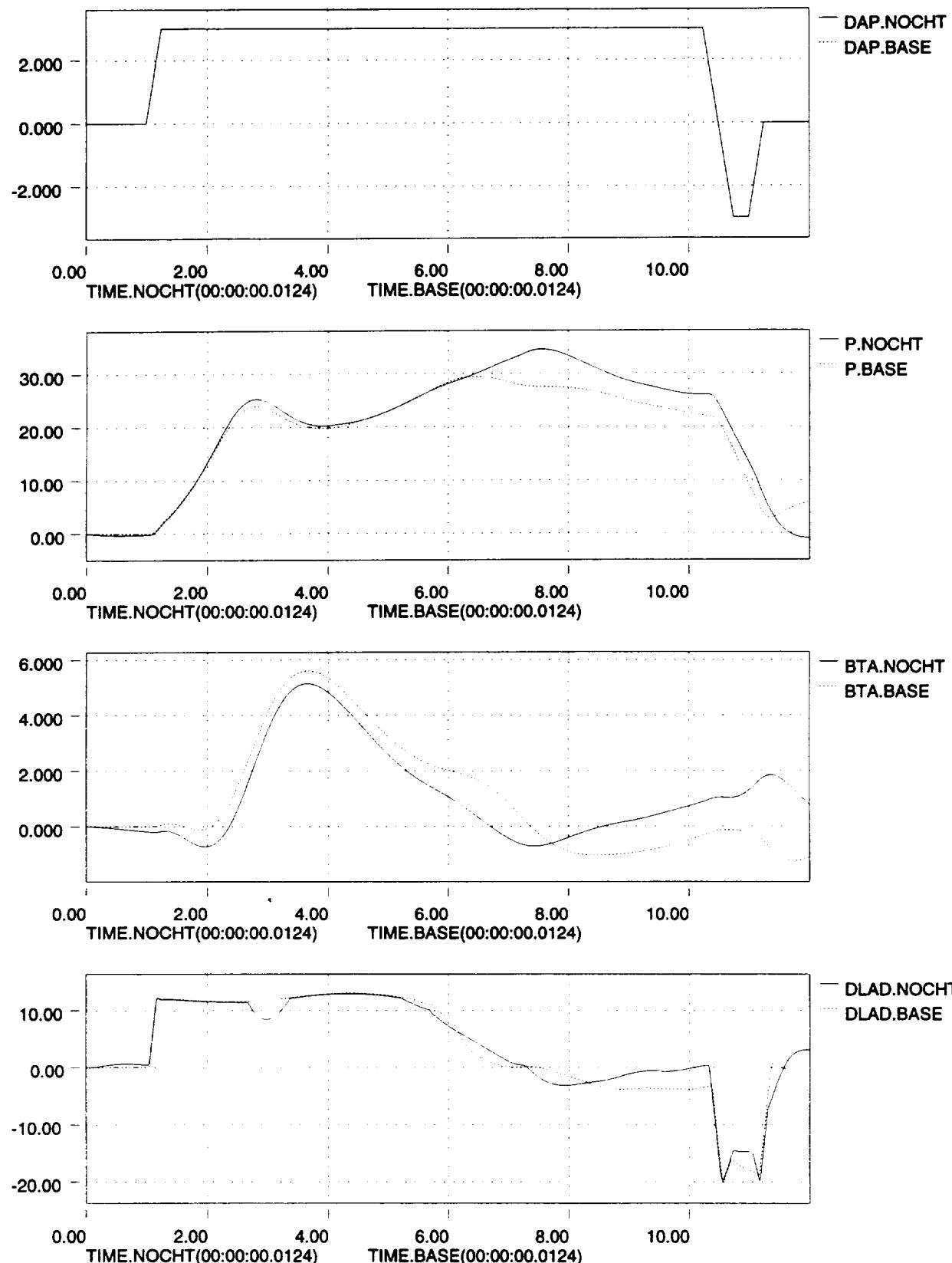


Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50_deg_AOA-25k_trim_Max_AB_360_deg_roll page 1/12



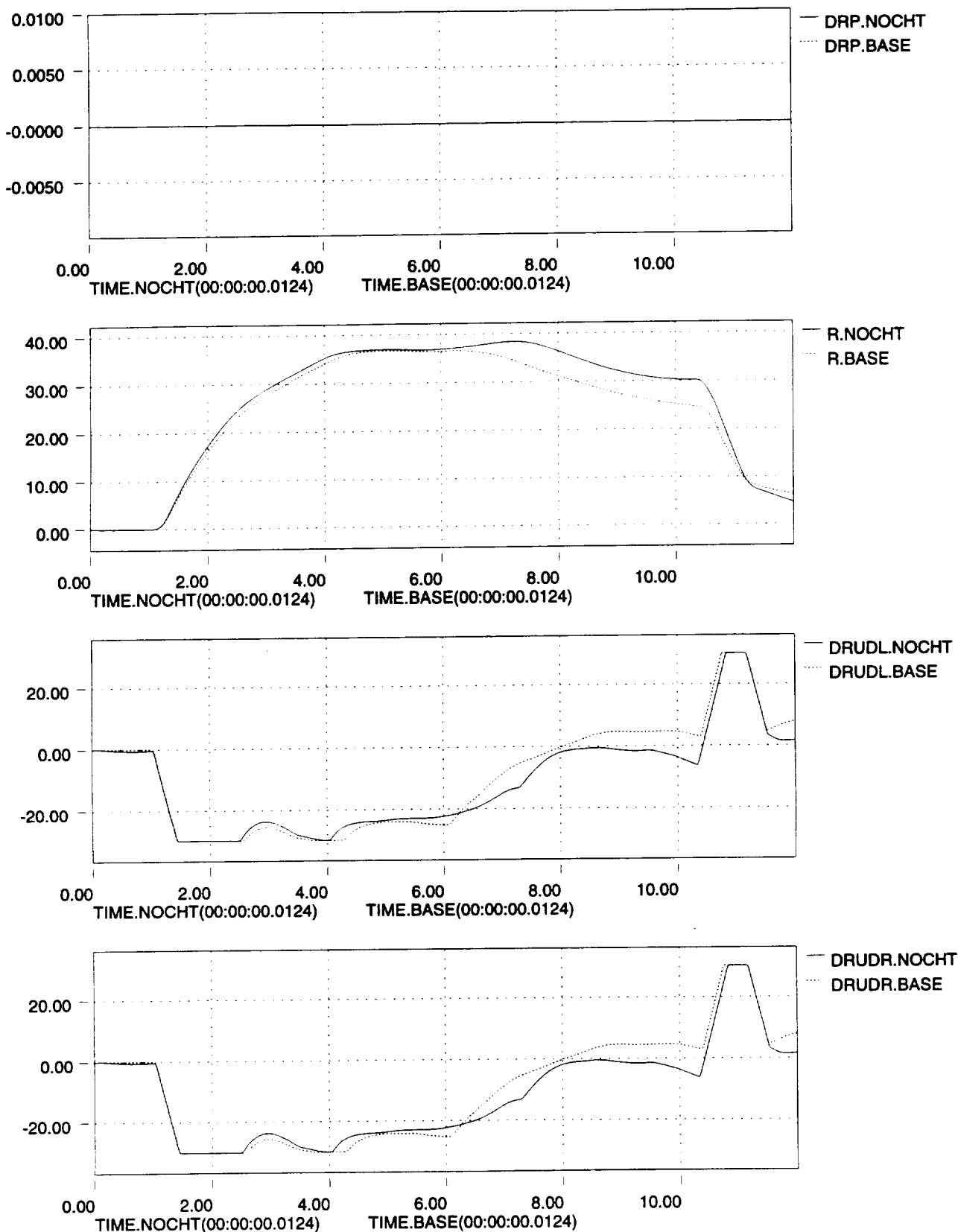
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Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 2/12



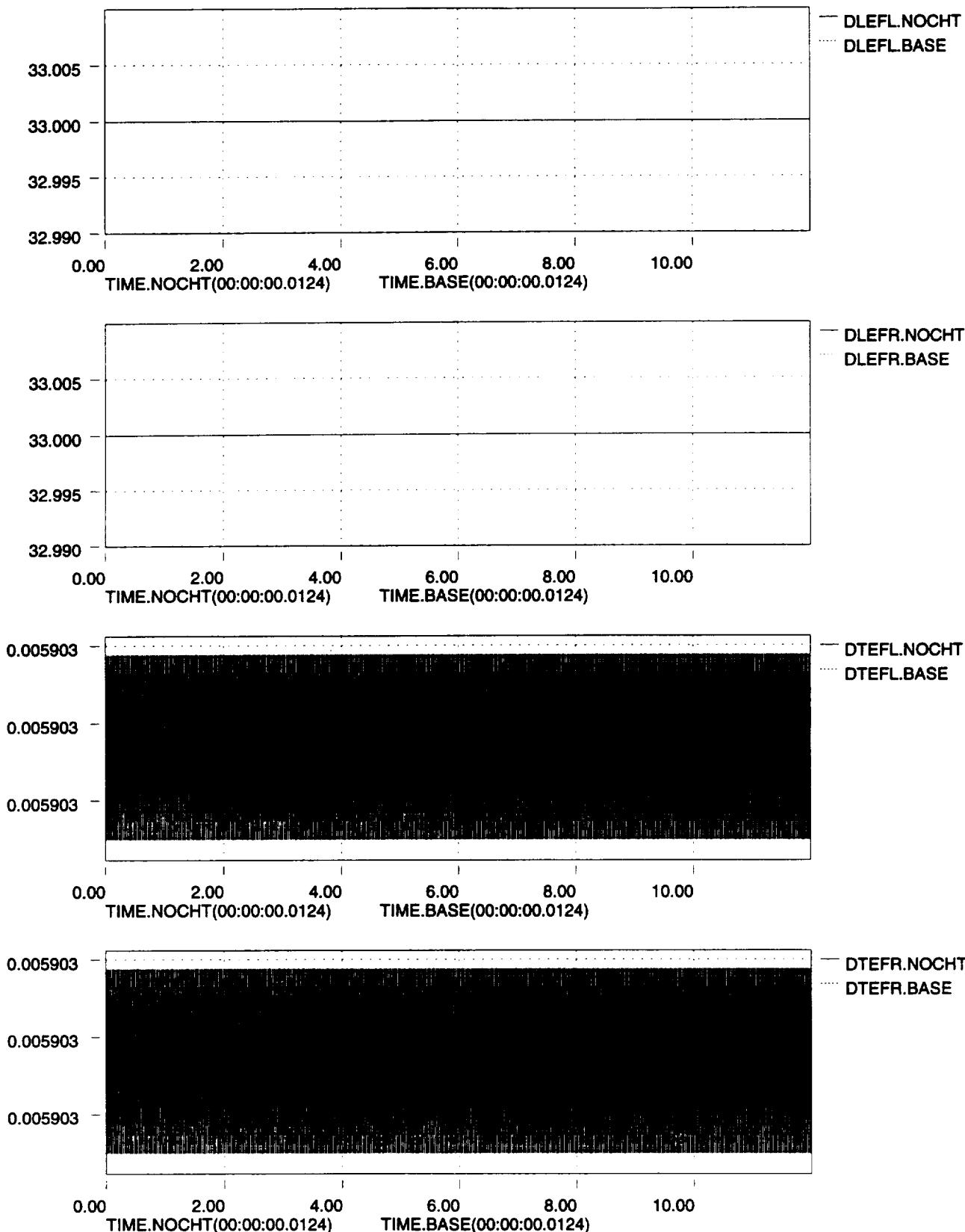
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Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 3/12



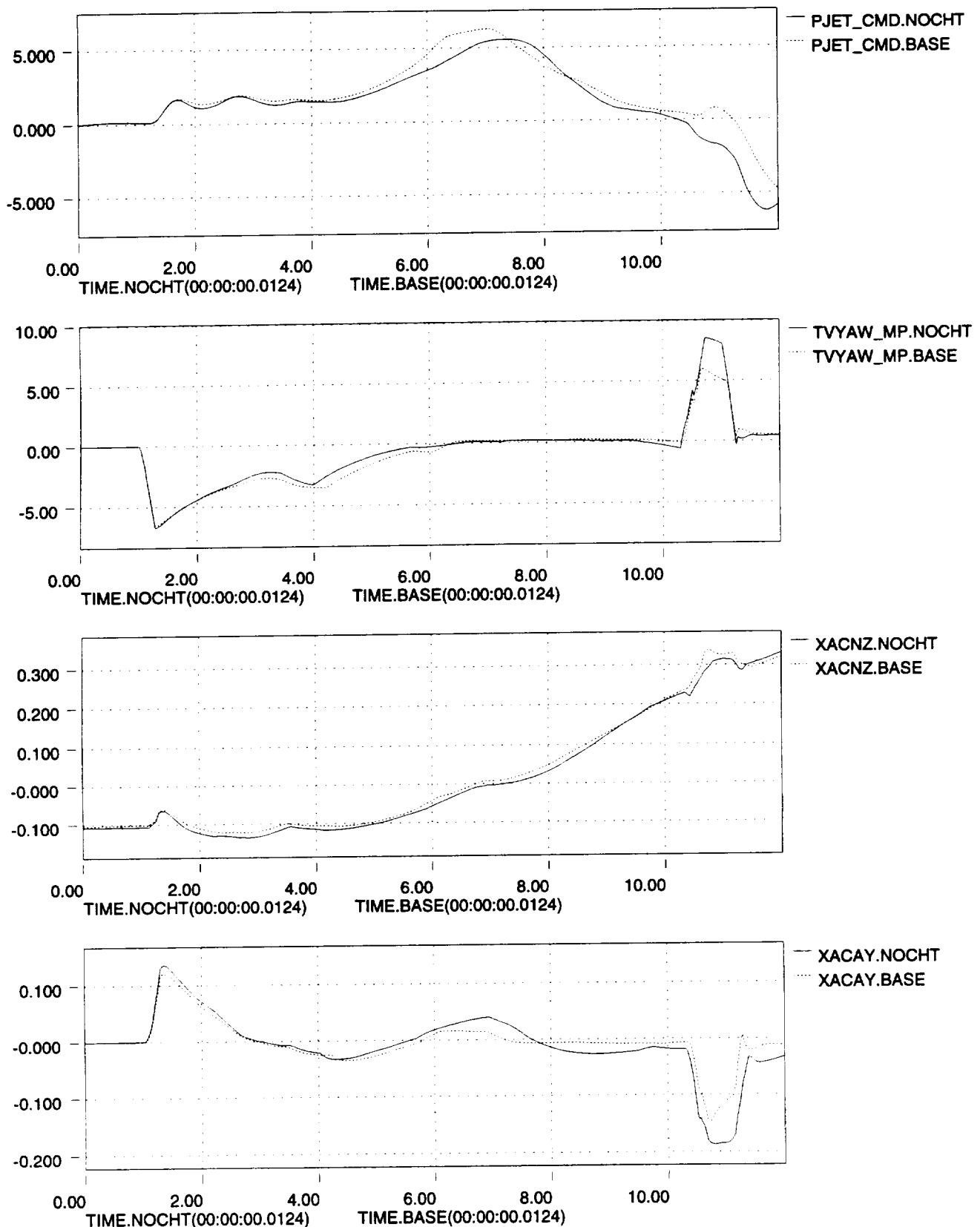
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Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 4/12



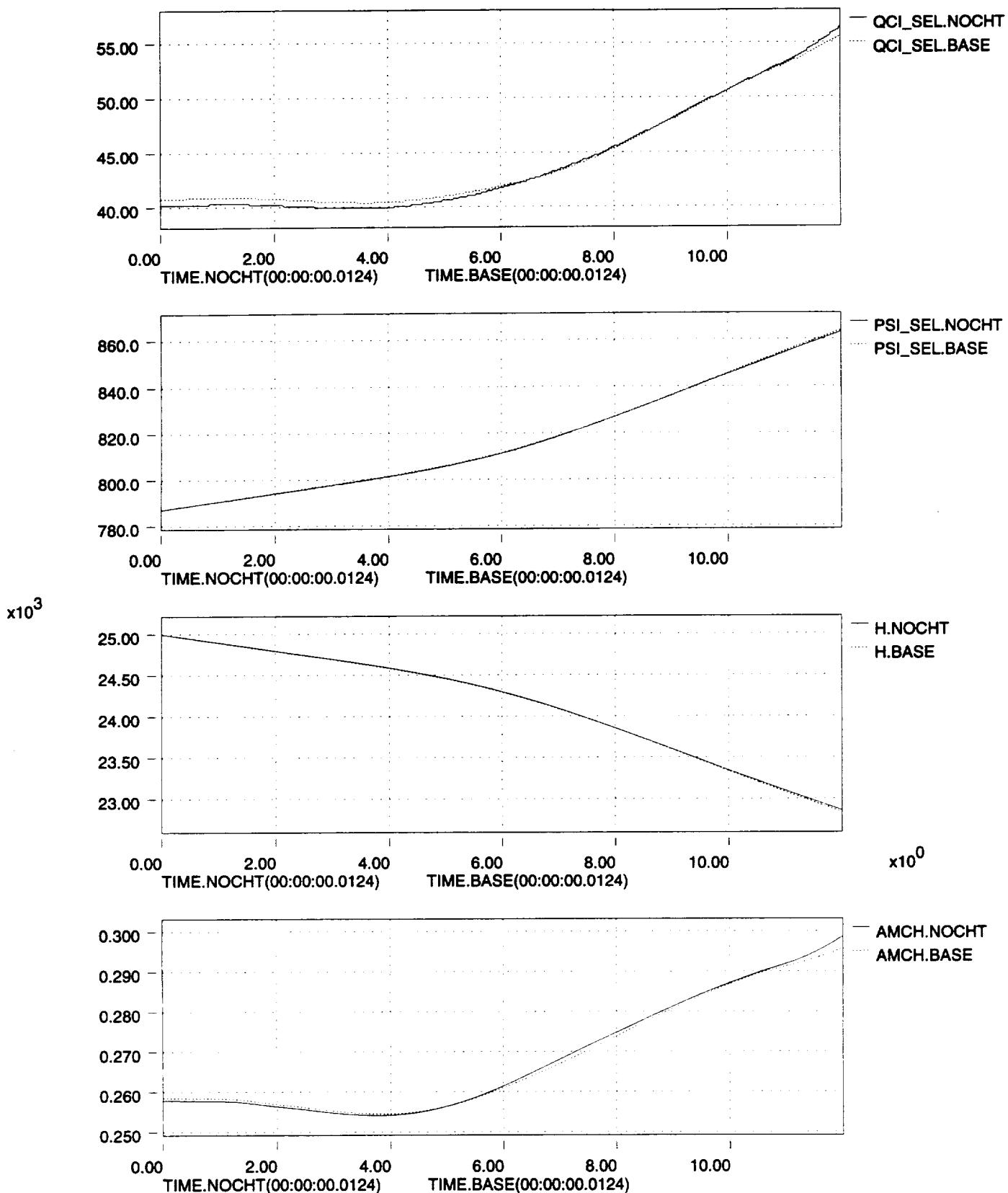
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Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 5/12



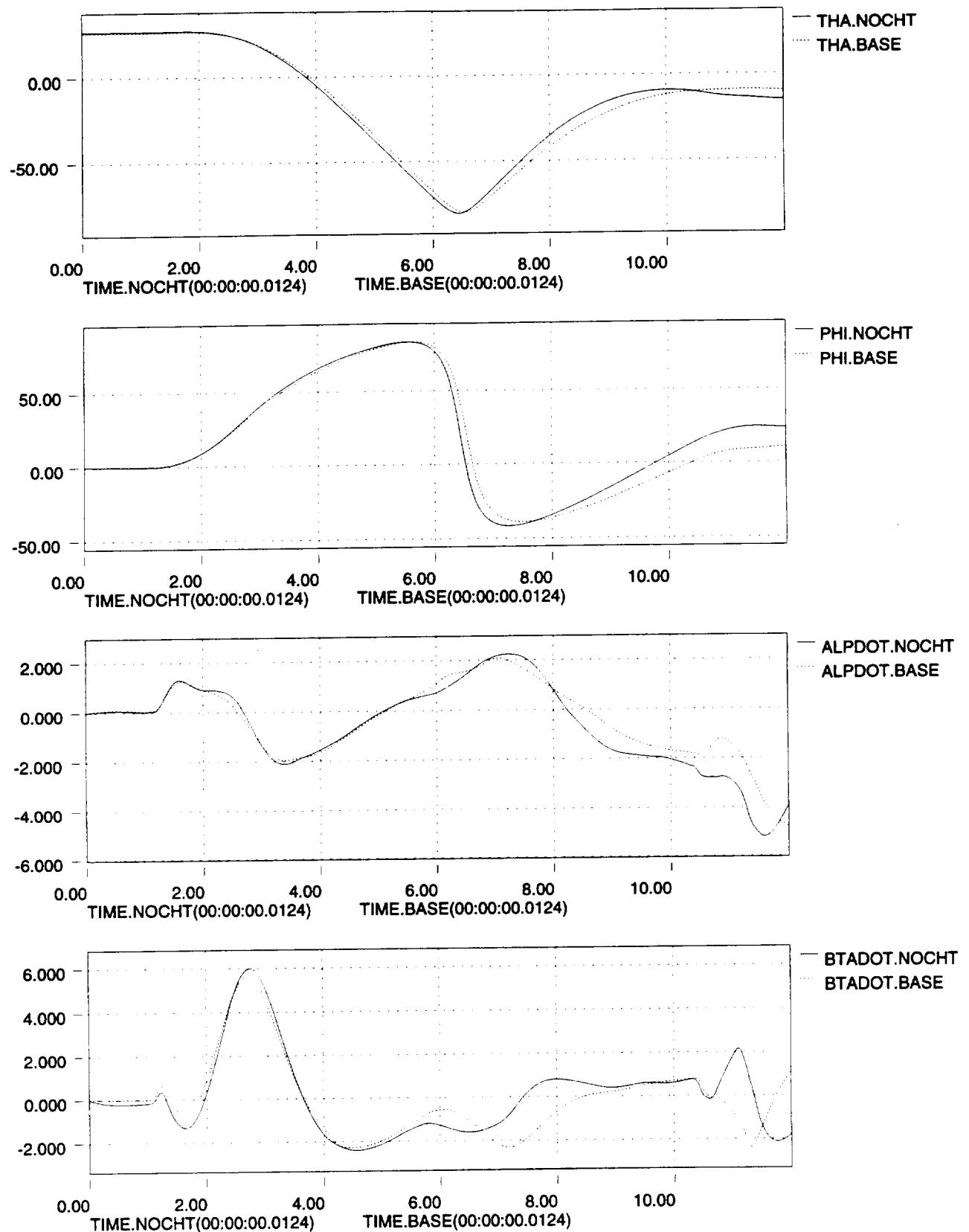
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 File=cht_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 6/12



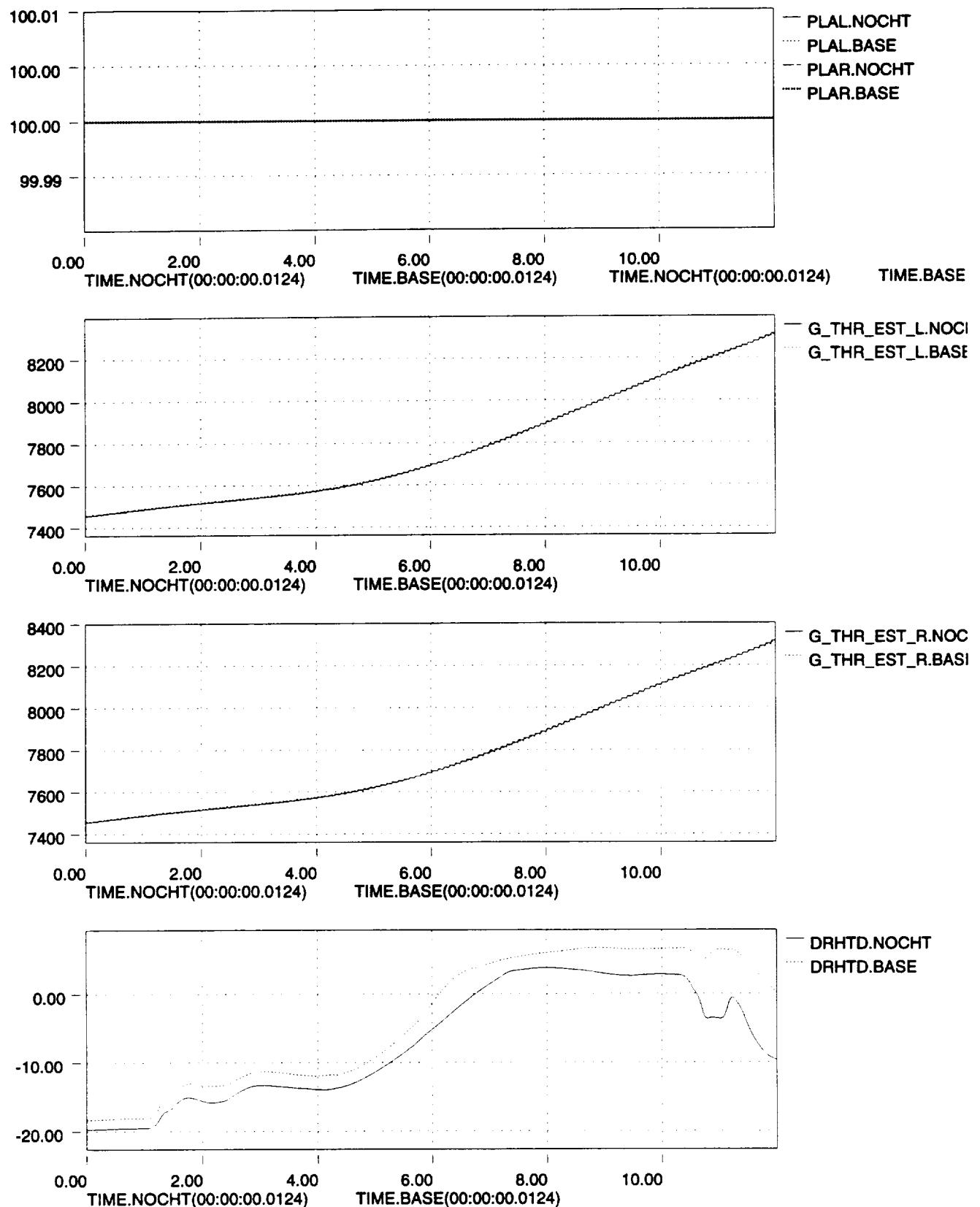
File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cght_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 7/12



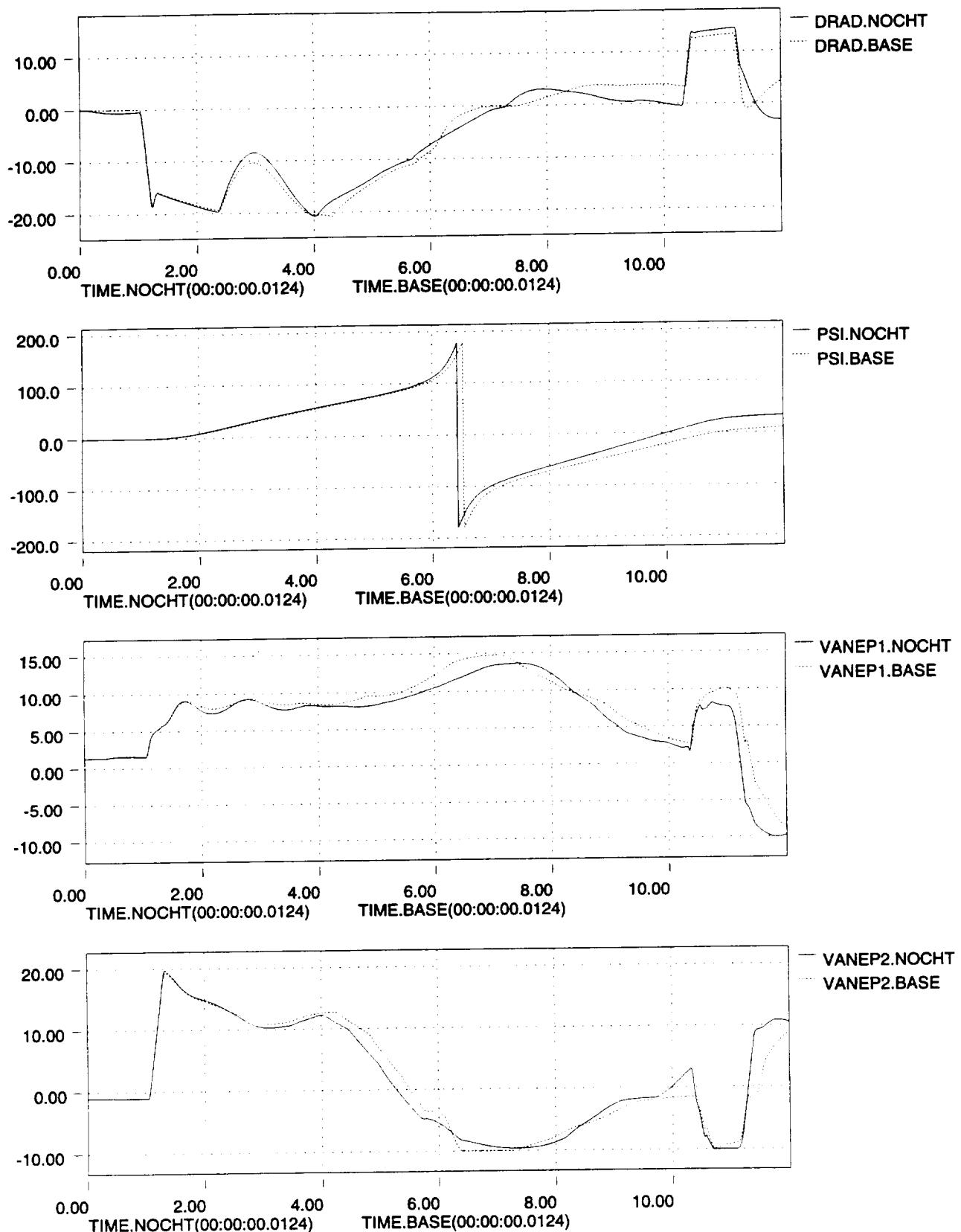
File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cht_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 8/12



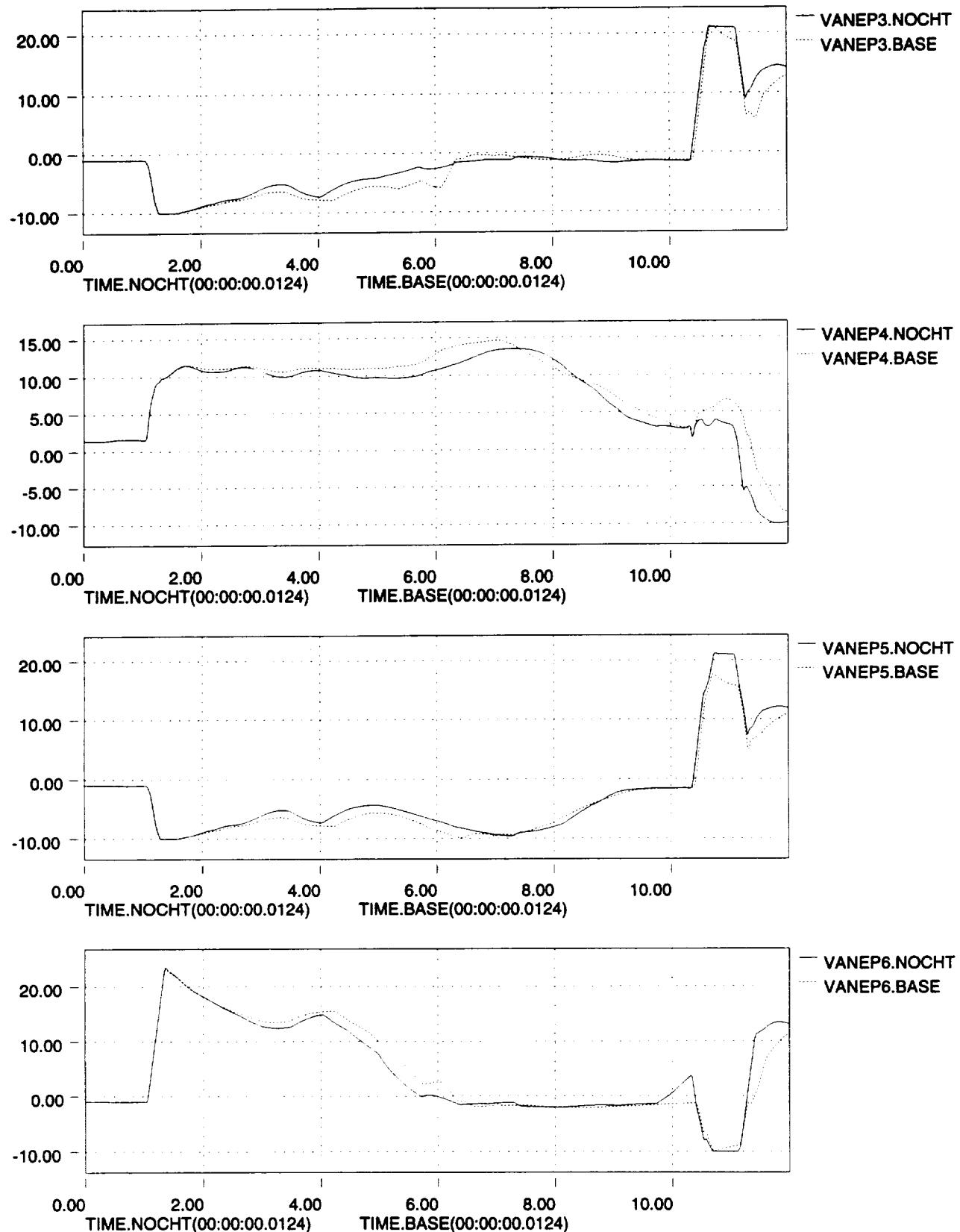
File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cght_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 9/12



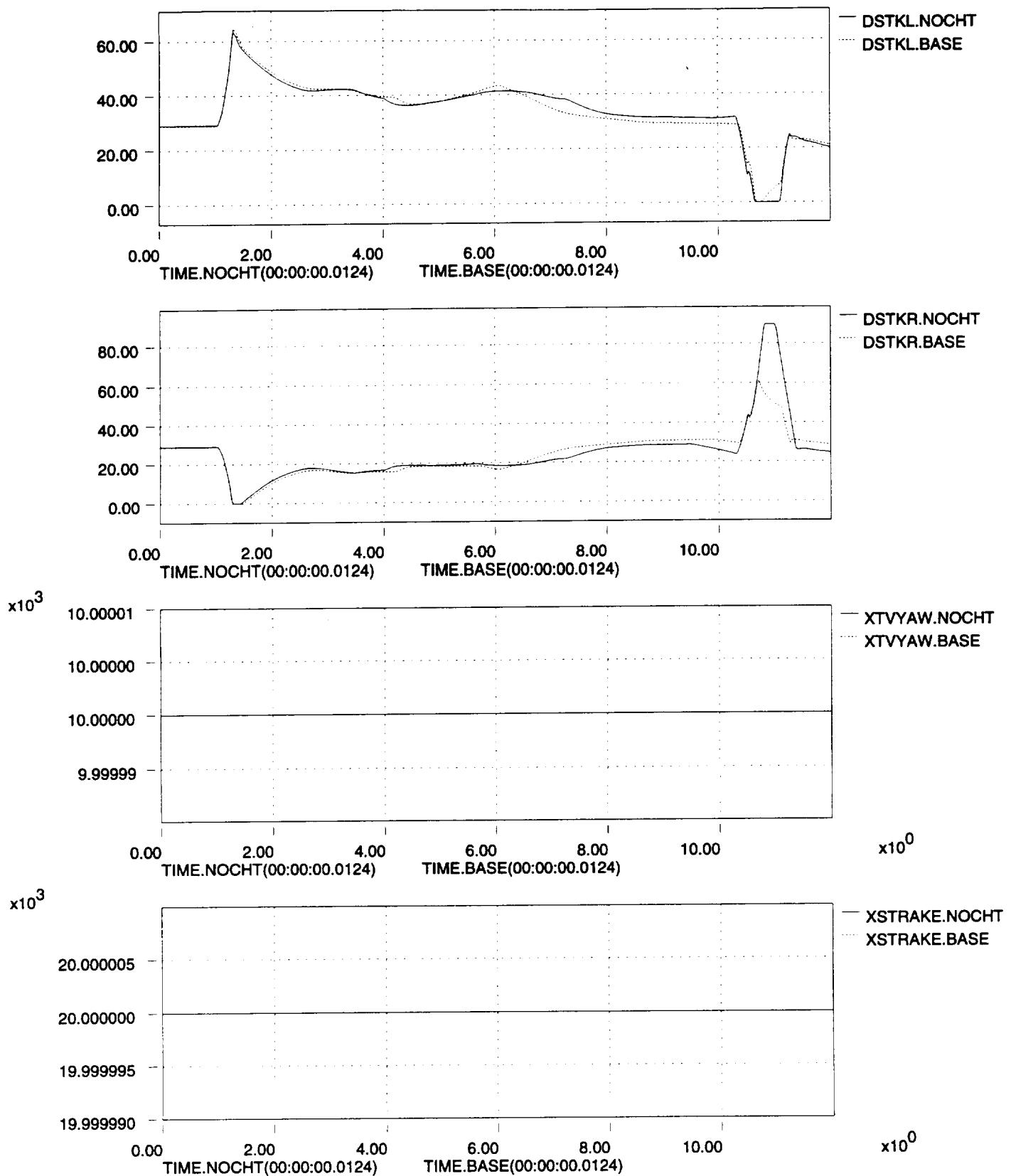
File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cht_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 10/12



File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cht_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 11/12



File=no_cht_3; Signal Suffix=.nocht; Date=
 File=cht_3; Signal Suffix=.base; Date=

Figure 7 - Spin Parachute Aerodynamics Removed, Weight & Balance Updated vs Baseline
 STV_Mode_50deg_AOA-25k_trim_Max_AB_360_deg_roll page 12/12

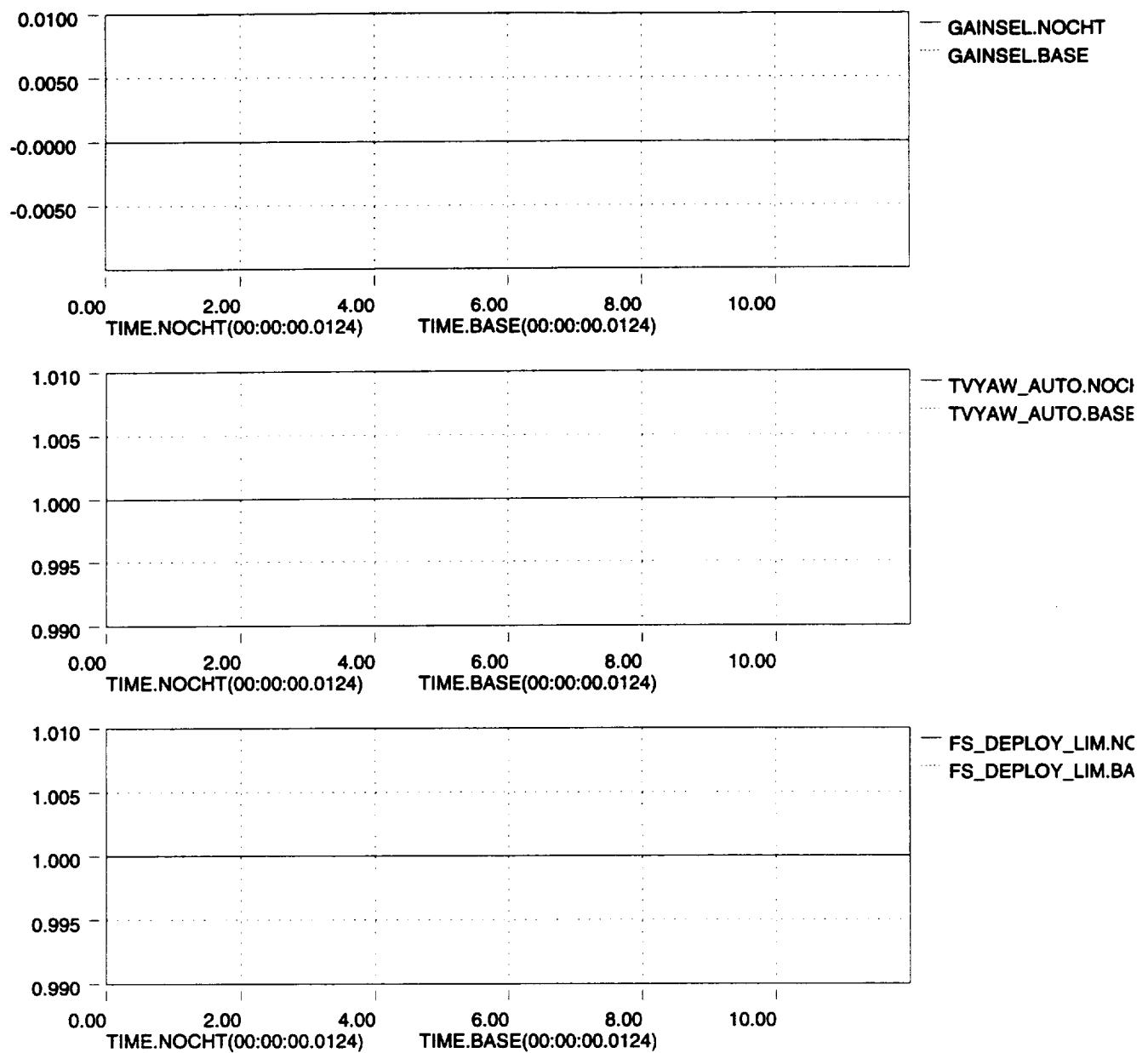


Table 1 - Linear Models

Linear_model_5_deg_AOA_25K_PLF

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Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSI0 | 9 | H | 10 |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|------------|-----------|------------|
| 1 | -0.0055578 | -1.008E-07 | 0.0303269 | 4.537E-04 | -51.559200 | 4.510E-05 | 0. | -32.044900 | 0. | -1.139E-04 |
| 2 | -1.832E-06 | -0.1331490 | 3.036E-07 | 52.043300 | 1.394E-07 | -593.34700 | 32.044900 | 0. | 1.076E-07 | 1.887E-08 |
| 3 | -0.0658153 | 1.153E-06 | -0.6006030 | -0.0097209 | 588.90400 | -6.146E-04 | 0. | -2.8051300 | 0. | 0.0011129 |
| 4 | -5.143E-05 | -0.0197754 | -4.685E-04 | -1.5294000 | -0.0114089 | 0.5379310 | 0. | 0. | 0. | 8.675E-07 |
| 5 | 1.365E-04 | 4.467E-08 | -0.0042730 | -6.780E-05 | -0.3243360 | -0.0774911 | 0. | 2.168E-07 | 0. | -1.102E-07 |
| 6 | 9.766E-07 | 0.0039883 | 3.480E-06 | -0.0079460 | 0.0708934 | -0.1040460 | 0. | 0. | 0. | 4.829E-09 |
| 7 | 0. | 0. | 0. | 1.0000000 | 0. | 0.0875381 | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 1.0000000 | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 1.0038200 | 0. | 0. | 0. | 0. |
| 10 | 0.0872040 | 0. | -0.9961910 | 0. | 0. | 0. | 0. | 596.00700 | 0. | 0. |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLIN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 | 8.568E-08 | 8.568E-08 | 0.0215537 | 0.0215523 | -0.0204844 | -0.0204785 | 0.0366666 | 0.0366666 | -0.0208981 | -0.0208995 |
| 2 | 0.1500300 | 0.1500300 | -0.0278477 | 0.0278475 | -0.0522946 | 0.0522956 | 0. | 0. | 0. | 0. |
| 3 | -9.765E-07 | -9.765E-07 | -0.2823640 | -0.2823480 | -0.5780440 | -0.5780260 | 0.0737987 | 0.0737987 | -0.6054440 | -0.6054290 |
| 4 | 0.0174710 | 0.0174710 | 0.1323060 | 0.1327450 | 0.1057300 | -0.1066330 | 5.803E-05 | 5.803E-05 | 0.1311180 | -0.1320640 |
| 5 | -1.102E-06 | -1.102E-06 | -0.0095752 | -0.0095745 | -0.0574753 | -0.0574738 | -0.0060023 | -0.0060023 | 0.0056120 | 0.0056126 |
| 6 | -0.0116483 | -0.0116483 | -0.0025050 | 0.0025065 | 0.0017307 | -0.0017136 | -4.670E-06 | -4.670E-06 | -0.0018728 | 0.0018907 |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | 0.0596234 | 0.0596235 | 0.0033652 | -3.725E-09 | 2.608E-08 | 0. | 0. | | | |
| 2 | -0.0028611 | 0.0028611 | -8.525E-08 | 0.0582974 | -3.662E-04 | 0. | 0. | | | |
| 3 | -7.035E-05 | -7.035E-05 | -0.0794340 | 3.190E-08 | -2.882E-07 | 0. | 0. | | | |
| 4 | -6.997E-05 | 7.141E-05 | -6.198E-05 | 1.213E-04 | 0.0048492 | 0. | 0. | | | |
| 5 | 1.208E-04 | 1.208E-04 | -0.0107405 | 1.339E-09 | -1.116E-08 | 0. | 0. | | | |
| 6 | 0.0010672 | -0.0010817 | 5.443E-07 | -0.0076221 | 7.744E-05 | 0. | 0. | | | |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSI0 | 9 | H | 10 |

Table 1 (Cont'd)

Linear_model_5_deg_AOA_25K_PLF

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Column vector names

| AY | 1 | AN | 2 | BETD | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------------|------------|-----------|-----------|-----------|------------|-----------|------------|-----------|------------|---|----|
| Matrix elements - rows across, columns down | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | | | | | | | | | |
| 1 | -5.696E-08 | -0.0041384 | 9.438E-09 | 0.0027136 | 4.325E-09 | 0.0159342 | 0. | 0. | 2.606E-11 | 5.866E-10 | | |
| 2 | 0.0020456 | -3.983E-08 | 0.0186674 | 3.022E-04 | 0.1540160 | 1.912E-05 | 0. | -1.708E-06 | 0. | -3.459E-05 | | |
| 3 | -1.501E-09 | -2.233E-04 | 6.469E-10 | 0.0873023 | 2.335E-10 | -0.9953350 | 0.0537551 | 0. | 1.808E-10 | 3.166E-11 | | |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLLN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| AY | 1 | AN | 2 | BETD | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------------|-----------|------------|-----------|------------|-----------|------------|------------|-----------|-----------|----|----|
| Matrix elements - rows across, columns down | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | | | | | | | | | |
| 1 | 0.0046631 | 0.0046631 | -8.655E-04 | 8.655E-04 | -0.0016254 | 0.0016254 | 0. | 0. | 0. | 0. | 0. | |
| 2 | 5.960E-08 | 5.960E-08 | 0.0087762 | 0.0087757 | 0.0179662 | 0.0179656 | -0.0022938 | -0.0022938 | 0.0188178 | 0.0188173 | | |
| 3 | 2.517E-04 | 2.517E-04 | -4.671E-05 | 4.671E-05 | -8.772E-05 | 8.773E-05 | 0. | 0. | 0. | 0. | 0. | |
| 11 | 12 | 13 | 14 | | | | | | | | | |
| 1 | -8.893E-05 | 8.893E-05 | -2.649E-09 | 0.0018119 | -1.138E-05 | 0. | 0. | 0. | | | | |
| 2 | 2.186E-06 | 2.186E-06 | 0.0024689 | 0. | 0. | 0. | 0. | 0. | | | | |
| 3 | -4.799E-06 | 4.799E-06 | -1.430E-10 | 9.779E-05 | -6.142E-07 | 0. | 0. | | | | | |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|------|-------------|---------------|----------|
| 1 | 0.00466575 | | |
| 2 | -6.9670E-26 | | |
| 3 | -0.00201672 | | |
| 4 | -0.00262344 | +/-0.07287920 | 0.072926 |
| 6 | -1.35600000 | | |
| 7 | -0.45988200 | +/-1.57902000 | 1.644620 |
| 9 | -0.20936700 | +/-1.78640000 | 1.798630 |
| | | | 0.035974 |

Complex eigenvectors

| 1 | 2 | 3 | 4 | 5 | |
|----|---------------|----------------------|----------------------|----------------------|----------------------|
| 1 | 0.1342450 0. | 3.706E-22 0. | 0.0134614 0. | 0.0306781 0.0444266 | 0.0306781-0.0444266 |
| 2 | 0.0310829 0. | 5.956E-23 0. | -1.415E-05 0. | -1.201E-04-1.346E-04 | -1.201E-04 1.346E-04 |
| 3 | -0.0163569 0. | -3.288E-23 0. | 4.100E-04 0. | 6.909E-04 8.166E-04 | 6.909E-04-8.166E-04 |
| 4 | -6.792E-07 0. | -1.199E-23 0. | 4.521E-08 0. | -2.233E-07-4.030E-07 | -2.233E-07 4.030E-07 |
| 5 | -2.542E-07 0. | 3.603E-25 0. | 9.413E-09 0. | 5.699E-06 6.921E-06 | 5.699E-06-6.921E-06 |
| 6 | 0.0011409 0. | 3.050E-24 0. | -3.599E-07 0. | -2.883E-07 2.031E-07 | -2.883E-07-2.031E-07 |
| 7 | 0.0212591 0. | -3.356E-09 0. | -6.796E-06 0. | -5.156E-06 3.596E-06 | -5.156E-06-3.596E-06 |
| 8 | -5.449E-05 0. | -5.390E-24 0. | -4.668E-06 0. | 9.203E-05-8.151E-05 | 9.203E-05 8.151E-05 |
| 9 | 0.2454530 0. | 1.0000000 0. | 1.792E-04 0. | 2.936E-06 3.865E-06 | 2.936E-06-3.865E-06 |
| 10 | -0.9591890 0. | -2.033E-20 0. | 0.9999090 0. | -0.6518530-0.7564200 | -0.6518530 0.7564200 |
| 6 | 7 | 8 | 9 | 10 | |
| 1 | 0.0027179 0. | 0.0626449 0.0364996 | 0.0626449-0.0364996 | 0.0028565-0.0072345 | 0.0028565 0.0072345 |
| 2 | -0.9861570 0. | -0.0573176-0.1002960 | -0.0573176 0.1002960 | -0.9952550 0.0154876 | -0.9952550-0.0154876 |
| 3 | -0.0554709 0. | -0.9672490 0.0057713 | -0.9672490-0.0057713 | -0.0718362 0.0599665 | -0.0718362-0.0599665 |
| 4 | 0.1247980 0. | -3.258E-04 0.0012829 | -3.258E-04-0.0012829 | 0.0056201-0.0069423 | 0.0056201 0.0069423 |
| 5 | 7.330E-05 0. | -2.160E-04 0.0025960 | -2.160E-04-0.0025960 | -2.296E-04-1.783E-04 | -2.296E-04 1.783E-04 |
| 6 | 0.0039296 0. | 1.695E-04-1.167E-04 | 1.695E-04 1.167E-04 | 1.909E-04 0.0022450 | 1.909E-04-0.0022450 |
| 7 | -0.0922881 0. | -6.901E-04-3.979E-04 | -6.901E-04 3.979E-04 | -0.0040898-0.0026760 | -0.0040898 0.0026760 |
| 8 | -5.405E-05 0. | -0.0014788-5.675E-04 | -0.0014788 5.675E-04 | -8.360E-05 1.383E-04 | -8.360E-05-1.383E-04 |
| 9 | -0.0029091 0. | 3.948E-05 1.193E-04 | 3.948E-05-1.193E-04 | 0.0012320-2.516E-04 | 0.0012320 2.516E-04 |
| 10 | -0.0171679 0. | 0.1840570 0.1091180 | 0.1840570-0.1091180 | 0.0107721-0.0135695 | 0.0107721 0.0135695 |

Table 1 (Cont'd)

Linear_model_20_deg_AOA_25K_PLF

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Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| 1 | 0.0107742 | -6.224E-07 | 0.0193443 | 1.931E-04 | -113.24100 | 6.732E-05 | 0. | -30.225200 | 0. | -4.552E-04 |
| 2 | 1.967E-06 | -0.0563898 | -3.375E-06 | 114.07100 | -6.283E-07 | -313.31100 | 30.225200 | 0. | -4.290E-07 | -4.262E-09 |
| 3 | -0.1018510 | 2.041E-06 | -0.2618180 | -0.0032788 | 311.09800 | -0.0011188 | 0. | -11.008400 | 0. | 0.0010626 |
| 4 | -8.139E-05 | -0.0222385 | -2.025E-04 | -0.5058520 | -0.0111913 | 0.4996510 | 0. | 0. | 0. | 8.316E-07 |
| 5 | 4.420E-04 | 6.523E-08 | -0.0014072 | -2.116E-05 | -0.1815810 | -0.0975344 | 0. | 1.004E-06 | 0. | -5.478E-07 |
| 6 | -5.013E-07 | -4.849E-04 | 9.348E-07 | 0.0066881 | 0.0891503 | -0.0640777 | 0. | 1.668E-09 | 0. | 4.118E-08 |
| 7 | 0. | 0. | 0. | 1.0000000 | 0. | 0.3642120 | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 1.0000000 | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 1.0642600 | 0. | 0. | 0. | 0. |
| 10 | 0.3422220 | 0. | -0.9396220 | 0. | 0. | 0. | 0. | 333.32000 | 0. | 0. |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLLN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 | 3.353E-08 | 3.353E-08 | 0.0163106 | 0.0163267 | -0.0163904 | -0.0163912 | 0.0515629 | 0.0515629 | -0.0088561 | -0.0088570 |
| 2 | 0.0282843 | 0.0282843 | -0.0038280 | 0.0038437 | -0.0050662 | 0.0050650 | 0. | 0. | 0. | 0. |
| 3 | -9.220E-08 | -9.220E-08 | -0.0448126 | -0.0448567 | -0.1509370 | -0.1509350 | 0.0018114 | 0.0018114 | -0.1133380 | -0.1133350 |
| 4 | 0.0029524 | 0.0029524 | 0.0239497 | -0.0240295 | 0.0240765 | -0.0243114 | 1.992E-06 | 1.992E-06 | 0.0293429 | -0.0295201 |
| 5 | 2.562E-06 | 2.562E-06 | -0.0011060 | -0.0011096 | -0.0144088 | -0.0144087 | -5.857E-04 | -5.857E-04 | 0.0010554 | 0.0010555 |
| 6 | -0.0024542 | -0.0024542 | -7.844E-04 | 7.857E-04 | -1.199E-04 | 1.268E-04 | -5.429E-06 | -5.429E-06 | -4.187E-04 | 4.231E-04 |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | 0.0580376 | 0.0580376 | 0.0038115 | -5.655E-06 | -6.706E-08 | 0. | 0. | | | |
| 2 | -0.0026304 | 0.0026304 | 8.878E-08 | 0.1210800 | -0.0017171 | 0. | 0. | | | |
| 3 | -5.068E-04 | -5.068E-04 | -0.1665440 | 2.151E-07 | -4.591E-07 | 0. | 0. | | | |
| 4 | -3.616E-05 | 3.673E-05 | -1.300E-04 | 6.060E-04 | 0.0104820 | 0. | 0. | | | |
| 5 | 4.740E-05 | 4.740E-05 | -0.0221356 | -4.878E-08 | -2.462E-08 | 0. | 0. | | | |
| 6 | 9.519E-04 | -9.646E-04 | 1.443E-06 | -0.0156199 | 2.177E-04 | 0. | 0. | | | |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Table 1 (Cont'd)

Linear_model_20_deg_AOA_25K_PLF

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Column vector names

| AY | 1 | AN | 2 | BETD | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|-----------|------------|------------|-----------|------------|------------|------------|----|------------|------------|---|----|
| Matrix elements - rows across, columns down | | | | | | | | | | | | |
| 1 | 6.115E-08 | -0.0017527 | -1.049E-07 | 0.0014290 | -1.953E-08 | -9.117E-04 | -5.307E-08 | 0. | 1.303E-11 | -1.325E-10 | | |
| 2 | 0.0031656 | -6.257E-08 | 0.0081376 | 1.018E-04 | 0.0678781 | 3.518E-05 | 0. | 0. | 0. | -3.303E-05 | | |
| 3 | 4.856E-09 | -1.682E-04 | -1.050E-08 | 0.3421580 | -1.885E-09 | -0.9397800 | 0.0906608 | 0. | -1.286E-09 | -1.279E-11 | | |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLNLN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| AY | 1 | AN | 2 | BETD | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------------|-----------|------------|------------|------------|-----------|------------|------------|-----------|-----------|----|----|
| Matrix elements - rows across, columns down | | | | | | | | | | | | |
| 1 | 8.791E-04 | 8.791E-04 | -1.190E-04 | 1.195E-04 | -1.575E-04 | 1.574E-04 | 0. | 0. | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 0.0013928 | 0.0013942 | 0.0046913 | 0.0046912 | -5.630E-05 | -5.630E-05 | 0.0035226 | 0.0035226 | | |
| 3 | 8.484E-05 | 8.484E-05 | -1.148E-05 | 1.153E-05 | -1.520E-05 | 1.519E-05 | 0. | 0. | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | | | |
| 1 | -8.176E-05 | 8.176E-05 | 2.759E-09 | 0.0037633 | -5.337E-05 | 0. | 0. | | | | | |
| 2 | 1.575E-05 | 1.575E-05 | 0.0051764 | -1.490E-08 | 1.490E-08 | 0. | 0. | | | | | |
| 3 | -7.890E-06 | 7.890E-06 | 2.663E-10 | 3.632E-04 | -5.151E-06 | 0. | 0. | | | | | |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|----------|
| 1 -1.8642E-25 | | | |
| 2 -0.00286343 | | | |
| 3 -0.12089200 | | | |
| 4 -0.01235500 | +/-0.12786000 | 0.128456 | 0.096181 |
| 6 -0.19904300 | | | |
| 7 -0.20134700 | +/-0.68862800 | 0.717460 | 0.280639 |
| 9 -0.15437000 | +/-1.51652000 | 1.524360 | 0.101269 |

Complex eigenvectors

| 1 | 2 | 3 | 4 | 5 |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 -1.452E-21 0. | -0.0071138 0. | -0.0239647 0. | -0.0415630 -0.0857593 | -0.0415630 0.0857593 |
| 2 5.294E-23 0. | -1.263E-05 0. | -0.0851016 0. | 0.0018244 5.220E-04 | 0.0018244 -5.220E-04 |
| 3 -3.888E-22 0. | -0.0018023 0. | 0.0712386 0. | -0.0085467 -0.0209568 | -0.0085467 0.0209568 |
| 4 4.136E-25 0. | 2.241E-07 0. | 0.0033890 0. | -3.630E-05 -3.781E-05 | -3.630E-05 3.781E-05 |
| 5 5.968E-26 0. | -3.096E-08 0. | 1.630E-05 0. | -1.626E-05 -4.788E-05 | -1.626E-05 4.788E-05 |
| 6 -2.843E-25 0. | -5.625E-07 0. | -0.0011529 0. | 2.472E-05 -2.998E-05 | 2.472E-05 2.998E-05 |
| 7 1.419E-08 0. | -6.699E-06 0. | -0.0245599 0. | 3.981E-04 -1.750E-04 | 3.981E-04 1.750E-04 |
| 8 2.456E-24 0. | 1.081E-05 0. | -1.348E-04 0. | 3.832E-04 -9.012E-05 | 3.832E-04 9.012E-05 |
| 9 1.0000000 0. | 2.091E-04 0. | 0.0101497 0. | 2.275E-04 2.277E-04 | 2.275E-04 -2.277E-04 |
| 10 -2.088E-19 0. | -0.9999730 0. | 0.9931710 0. | 0.2165980 0.9713330 | 0.2165980 -0.9713330 |
| | 6 | 7 | 8 | 9 |
| 1 0.0158390 0. | 0.2784570 0.0737706 | 0.2784570 -0.0737706 | -0.0015505 0.0013317 | -0.0015505 -0.0013317 |
| 2 0.3451520 0. | -0.0244800 0.0315303 | -0.0244800 -0.0315303 | 0.9168320 0.3988620 | 0.9168320 -0.3988620 |
| 3 -0.1542270 0. | -0.5009040 -0.7156460 | -0.5009040 0.7156460 | 0.0028943 -0.0048679 | 0.0028943 0.0048679 |
| 4 -0.0211707 0. | -4.978E-04 -9.347E-04 | -4.978E-04 9.347E-04 | 0.0026924 -0.0140007 | 0.0026924 0.0140007 |
| 5 -1.954E-05 0. | 0.0014956 -0.0012775 | 0.0014956 0.0012775 | -2.279E-05 -1.600E-05 | -2.279E-05 1.600E-05 |
| 6 0.0023034 0. | -2.295E-04 -1.594E-04 | -2.295E-04 1.594E-04 | 2.063E-04 -2.703E-04 | 2.063E-04 2.703E-04 |
| 7 0.1021470 0. | -0.0011007 0.0011661 | -0.0011007 -0.0011661 | 0.0090178 0.0027429 | 0.0090178 -0.0027429 |
| 8 9.816E-05 0. | -0.0022940 -0.0015011 | -0.0022940 0.0015011 | 1.195E-05 -1.381E-05 | 1.195E-05 1.381E-05 |
| 9 -0.0123162 0. | -1.315E-04 3.931E-04 | -1.315E-04 -3.931E-04 | 1.732E-04 1.624E-04 | 1.732E-04 -1.624E-04 |
| 10 -0.9196700 0. | 0.3417350 0.1886100 | 0.3417350 -0.1886100 | -3.269E-04 4.508E-04 | -3.269E-04 -4.508E-04 |

Table 1 (Cont'd)

Linear_model_40_deg_AOA_25K_PLF

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ACSL Runtime Exec Version 11.2.1

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|------------|----|------------|
| 1 | 0.0197273 | -9.123E-08 | 0.0097546 | 0.2985060 | -165.53700 | 0.2986480 | 0. | -28.412700 | 0. | -6.270E-04 |
| 2 | -1.609E-12 | -0.0605159 | -4.561E-14 | 167.39100 | 1.832E-12 | -200.17600 | 28.422300 | 0. | 0. | 6.609E-15 |
| 3 | -0.1078550 | 1.140E-07 | -0.2131240 | -0.4044670 | 197.43600 | -0.4043290 | 0. | -15.075200 | 0. | 0.0010169 |
| 4 | -8.394E-05 | -0.0031485 | -1.663E-04 | -0.4921080 | -0.0116245 | 0.0375078 | 0. | -8.831E-06 | 0. | 7.866E-07 |
| 5 | 0.0010368 | 8.553E-09 | -0.0018042 | 0.0099073 | -0.3773610 | -0.0876157 | 0. | -8.040E-04 | 0. | 8.501E-07 |
| 6 | -1.311E-06 | -0.0022987 | 1.293E-06 | 0.0155135 | 0.0889820 | -0.1136310 | 0. | -8.805E-07 | 0. | 5.752E-08 |
| 7 | 0. | 0. | 0. | 1.0000000 | 0. | 0.5300010 | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 1.0000000 | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 1.1317700 | 0. | 0. | 0. | 0. |
| 10 | 0.4682930 | 0. | -0.8835720 | 0. | 0. | 0. | 0. | 255.50500 | 0. | 0. |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLIN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|-----------|----|----|
| 1 | -2.235E-08 | -2.235E-08 | 0.0041226 | 0.0041223 | -0.0196561 | -0.0196566 | 0. | 0. | 0. | 0. |
| 2 | 0.0091668 | 0.0091668 | 0.0130060 | -0.0130060 | 0.0136722 | -0.0136722 | 0. | 0. | 0. | 0. |
| 3 | 2.980E-08 | 2.980E-08 | -0.0049133 | -0.0049130 | -0.1088240 | -0.1088230 | 0. | 0. | 0. | 0. |
| 4 | -3.034E-04 | -3.034E-04 | 0.0085367 | 0.0085443 | 0.0152081 | -0.0153785 | 0. | 0. | 0. | 0. |
| 5 | 1.863E-09 | 1.863E-09 | -6.194E-04 | -6.194E-04 | -0.0082795 | -0.0082794 | 2.265E-06 | 2.265E-06 | 0. | 0. |
| 6 | -9.638E-04 | -9.638E-04 | -7.738E-04 | 7.730E-04 | -0.0012447 | 0.0012512 | 0. | 0. | 0. | 0. |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | 0.0278171 | 0.0278171 | -0.0076939 | -4.023E-07 | 4.172E-07 | 0. | 0. | | | |
| 2 | -0.0013836 | 0.0013836 | 2.320E-14 | 0.2257120 | 0.0111612 | 0. | 0. | | | |
| 3 | -5.179E-04 | -5.179E-04 | -0.3733860 | 4.917E-07 | -4.955E-07 | 0. | 0. | | | |
| 4 | 2.819E-06 | -3.001E-06 | -2.916E-04 | 0.0019050 | 0.0244358 | 0. | 0. | | | |
| 5 | -1.418E-05 | -1.418E-05 | -0.0474258 | 3.353E-08 | -3.399E-08 | 0. | 0. | | | |
| 6 | 4.612E-04 | -4.670E-04 | 4.978E-06 | -0.0290557 | -0.0017863 | 0. | 0. | | | |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Table 1 (cont'd)

Linear_model_40_deg_AOA_25K_PLF

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Column vector names

AY 1

AN 2

BETD

3

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------------|------------|------------|------------|-----------|------------|-----------|-----------|----|------------|
| 1 | -5.002E-14 | -0.0018809 | -1.418E-15 | -0.0185216 | 5.695E-14 | 6.797E-04 | 0. | 0. | 0. | 2.054E-16 |
| 2 | 0.0033523 | 0. | 0.0066241 | 0.0125713 | 0.0858473 | 0.0125669 | 0. | 3.552E-04 | 0. | -3.161E-05 |
| 3 | -3.991E-15 | -2.278E-04 | 1.644E-15 | 0.6405080 | 7.012E-15 | -0.7659600 | 0.1087560 | 0. | 0. | 2.529E-17 |

Row vector names

DRLLN 1

DRRLN 2

DALLN 3

DARLN 4

DSLLN 5

DSRLN 6

DNLLN 7

DNRLN 8

DFLLN 9

DFRLN 10

DPLLN 11

DPRLN 12

PJETLN 13

YJETLN 14

RJETLN 15

DTSYLN 16

DTASLN 17

Column vector names

AY 1

AN 2

BETD

3

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------------|-----------|-----------|------------|-----------|------------|----|----|----|----|
| 1 | 2.849E-04 | 2.849E-04 | 4.042E-04 | -4.042E-04 | 4.249E-04 | -4.249E-04 | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 1.527E-04 | 1.527E-04 | 0.0033824 | 0.0033823 | 0. | 0. | 0. | 0. |
| 3 | 3.508E-05 | 3.508E-05 | 4.977E-05 | -4.977E-05 | 5.232E-05 | -5.232E-05 | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | -4.300E-05 | 4.300E-05 | 7.209E-16 | 0.0070154 | 3.469E-04 | 0. | 0. | | | |
| 2 | 1.610E-05 | 1.610E-05 | 0.0116052 | -1.490E-08 | 1.490E-08 | 0. | 0. | | | |
| 3 | -5.294E-06 | 5.294E-06 | 8.876E-17 | 8.637E-04 | 4.271E-05 | 0. | 0. | | | |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|-----------|
| 1 0.14794600 | +/-0.24338600 | 0.284824 | -0.519429 |
| 3 0. | | | |
| 4 -0.00487864 | | | |
| 5 -0.04289660 | +/-0.15095100 | 0.156928 | 0.273353 |
| 7 -0.48024600 | +/-0.37149200 | 0.607159 | 0.790972 |
| 9 -0.24087000 | +/-0.68844900 | 0.729370 | 0.330244 |

Complex eigenvectors

| 1 | 2 | 3 | 4 | 5 |
|-------------------------|----------------------|----------------------|----------------------|----------------------|
| 1 0.0690302-0.2411650 | 0.0690302 0.2411650 | 0. | 0. | 0.0052615 0. |
| 2 -0.9359210-0.1104560 | -0.9359210 0.1104560 | 0. | 0. | -6.372E-06 0. |
| 3 -0.0997742-0.0866933 | -0.0997742-0.0866933 | 0. | 0. | 0.0034516 0. |
| 4 0.0044056-0.0013394 | 0.0044056 0.0013394 | 0. | 0. | -3.801E-07 0. |
| 5 -2.828E-04-4.944E-05 | -2.828E-04 4.944E-05 | 0. | 0. | 8.197E-08 0. |
| 6 0.0049331-0.0037140 | 0.0049331 0.0037140 | 0. | 0. | 6.542E-07 0. |
| 7 0.0028787-0.0270939 | 0.0028787 0.0270939 | 0. | 0. | 6.833E-06 0. |
| 8 -6.641E-04 7.583E-04 | -6.641E-04-7.583E-04 | 0. | 0. | -1.680E-05 0. |
| 9 -0.0024288-0.0244159 | -0.0024288 0.0244159 | 1.0000000 | 0. | -1.518E-04 0. |
| 10 -0.0770808 0.1552700 | -0.0770808-0.1552700 | 0. | 0. | 0.9999800 0. |
| | 6 | 7 | 8 | 9 |
| 1 -0.0135372-0.1264500 | -0.0832726 0.0062733 | -0.0832726-0.0062733 | 0.4950260-0.3216730 | 0.4950260 0.3216730 |
| 2 -0.0054332-0.0060059 | -0.8745830-0.4448920 | -0.8745830 0.4448920 | 0.0967593 0.0846018 | 0.0967593-0.0846018 |
| 3 -0.0130792-0.0492484 | 0.1345890-0.0956605 | 0.1345890 0.0956605 | -0.3371710 0.6948100 | -0.3371710-0.6948100 |
| 4 7.250E-05 5.961E-05 | -0.0037013 0.0070855 | -0.0037013-0.0070855 | 3.229E-04-5.743E-04 | 3.229E-04 5.743E-04 |
| 5 -2.711E-05 9.934E-05 | -3.767E-04-1.204E-04 | -3.767E-04 1.204E-04 | 0.0025428 0.0011147 | 0.0025428-0.0011147 |
| 6 6.139E-05 4.570E-05 | -0.0041133 0.0011083 | -0.0041133-0.0011083 | 1.425E-04 3.764E-05 | 1.425E-04-3.764E-05 |
| 7 3.391E-05 7.055E-04 | -7.034E-05 0.0159227 | -7.034E-05 0.0159227 | 5.370E-04 7.666E-04 | 5.370E-04-7.666E-04 |
| 8 -5.617E-04 3.392E-04 | 6.121E-04 2.228E-04 | 6.121E-04 2.228E-04 | -0.0025939 0.0027860 | -0.0025939-0.0027860 |
| 9 -4.381E-04 3.358E-04 | 0.0048006-0.0063253 | 0.0048006 0.0063253 | -1.281E-04 1.894E-04 | -1.281E-04-1.894E-04 |
| 10 0.6759380 0.7240670 | -0.0287895-0.0413314 | -0.0287895 0.0413314 | 0.1284580-0.1482790 | 0.1284580 0.1482790 |

Table 1 (Cont'd)

Linear_model_50_deg_AOA_25K_PLF

Fri Nov 3 11:30:57 1995

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ACSL Runtime Exec Version 11.2.1

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|------------|----|------------|
| 1 | 0.0131890 | -5.133E-07 | 0.0157537 | 5.618E-05 | -198.01900 | 6.130E-05 | 0. | -28.561600 | 0. | -6.004E-04 |
| 2 | -1.511E-06 | -0.0464210 | 1.844E-06 | 199.26700 | -1.343E-07 | -167.57100 | 28.661500 | 0. | 0. | -2.272E-09 |
| 3 | -0.1148130 | 2.388E-06 | -0.1893780 | -3.268E-04 | 166.60900 | -4.392E-04 | 0. | -14.603500 | 0. | 0.0010196 |
| 4 | -8.994E-05 | -0.0124989 | -1.480E-04 | -0.1937530 | -0.0104416 | 0.3040340 | 0. | 0. | 0. | 7.921E-07 |
| 5 | 0.0028023 | -2.103E-07 | -0.0026219 | -4.282E-05 | 0.0658643 | -0.0975787 | 0. | 0. | 0. | 2.892E-07 |
| 6 | -7.543E-07 | -0.0033348 | 4.497E-07 | 0.0977776 | 0.0890105 | -0.1316760 | 0. | 0. | 0. | 5.472E-08 |
| 7 | 0. | 0. | 0. | 1.0000000 | 0. | 0.5095180 | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 1.0000000 | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 1.1223200 | 0. | 0. | 0. | 0. |
| 10 | 0.4539840 | 0. | -0.8910120 | 0. | 0. | 0. | 0. | 240.32000 | 0. | 0. |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLLN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| | | | | | | | | | |
|----|---|------|---|------|---|------|---|----|----|
| UD | 1 | VD | 2 | WD | 3 | PD | 4 | QD | 5 |
| RD | 6 | PHID | 7 | THED | 8 | PSID | 9 | HD | 10 |

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------------|------------|------------|------------|------------|------------|-----------|-----------|----|----|
| 1 | 0. | 0. | 0.0017779 | 0.0017035 | -0.0063138 | -0.0063138 | 0. | 0. | 0. | 0. |
| 2 | 0.0074298 | 0.0074298 | -0.0058524 | 0.0060348 | 0.0201558 | -0.0201559 | 0. | 0. | 0. | 0. |
| 3 | 0. | 0. | -0.0014922 | -0.0014280 | -0.1223790 | -0.1223790 | 0. | 0. | 0. | 0. |
| 4 | -0.0015256 | -0.0015256 | 0.0074121 | -0.0074143 | 0.0203013 | -0.0204926 | 0. | 0. | 0. | 0. |
| 5 | 1.231E-05 | 1.231E-05 | -5.147E-04 | -5.128E-04 | -0.0097578 | -0.0097578 | 2.251E-06 | 2.251E-06 | 0. | 0. |
| 6 | -9.654E-04 | -9.654E-04 | -8.995E-04 | 9.015E-04 | 2.792E-04 | -2.752E-04 | 0. | 0. | 0. | 0. |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | 0.0273182 | 0.0273182 | 0.0011265 | -1.849E-05 | 0. | 0. | 0. | | | |
| 2 | -0.0013434 | 0.0013434 | 0. | 0.2154290 | 0.0106531 | 0. | 0. | | | |
| 3 | -5.330E-04 | -5.330E-04 | -0.3664960 | -1.649E-05 | 0. | 0. | 0. | | | |
| 4 | 1.926E-06 | -2.144E-06 | -2.861E-04 | 0.0022362 | 0.0239749 | 0. | 0. | | | |
| 5 | -1.579E-05 | -1.579E-05 | -0.0456841 | -1.784E-06 | 3.492E-10 | 0. | 0. | | | |
| 6 | 4.516E-04 | -4.574E-04 | 3.912E-06 | -0.0282539 | -0.0017397 | 0. | 0. | | | |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |

Row vector names

| | | | | | | | | | |
|---|---|------|---|------|---|------|---|---|----|
| U | 1 | V | 2 | W | 3 | P | 4 | Q | 5 |
| R | 6 | PHIO | 7 | THEO | 8 | PSIO | 9 | H | 10 |

Table 1 (Cont'd)

Linear_model_50_deg_AOA_25K_PLF

Fri Nov 3 11:30:57 1995

2/2

Column vector names

| | AY | 1 | AN | 2 | BETD | 3 | | | | |
|---|------------|------------|------------|-----------|------------|------------|-----------|-----------|----|------------|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Matrix elements - rows across, columns down | 1 | -4.697E-08 | -0.0014428 | 5.732E-08 | -0.0238817 | -4.174E-09 | 0.0086527 | 5.307E-08 | 0. | -7.061E-11 |
| 1 | 0.0035685 | -7.985E-08 | 0.0058861 | 1.025E-05 | 0.0385656 | 1.366E-05 | 0. | 0. | 0. | -3.169E-05 |
| 2 | -6.440E-09 | -1.748E-04 | 6.284E-09 | 0.7631020 | -5.143E-10 | -0.6417210 | 0.1097600 | 0. | 0. | -8.700E-12 |

Row vector names

| | | | | | | | | | |
|--------|----|--------|----|--------|----|--------|----|--------|----|
| DRLLN | 1 | DRRLN | 2 | DALLN | 3 | DARLN | 4 | DSLLN | 5 |
| DSRLN | 6 | DNLLN | 7 | DNRLN | 8 | DFLLN | 9 | DFRLN | 10 |
| DPLLN | 11 | DPRLN | 12 | PJETLN | 13 | YJETLN | 14 | RJETLN | 15 |
| DTSYLN | 16 | DTASLN | 17 | | | | | | |

Column vector names

| | AY | 1 | AN | 2 | BETD | 3 | | | | |
|---|------------|-----------|------------|------------|-----------|------------|------------|----|----|----|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Matrix elements - rows across, columns down | 1 | 2.309E-04 | 2.309E-04 | -1.819E-04 | 1.876E-04 | 6.265E-04 | -6.265E-04 | 0. | 0. | 0. |
| 1 | 0. | 0. | 4.640E-05 | 4.438E-05 | 0.0038037 | 0.0038037 | 0. | 0. | 0. | 0. |
| 2 | 2.845E-05 | 2.845E-05 | -2.241E-05 | 2.311E-05 | 7.719E-05 | -7.719E-05 | 0. | 0. | 0. | 0. |
| 3 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | | | |
| 1 | -4.176E-05 | 4.176E-05 | 0. | 0.0066957 | 3.311E-04 | 0. | 0. | | | |
| 2 | 1.657E-05 | 1.657E-05 | 0.0113910 | 5.215E-07 | 0. | 0. | 0. | | | |
| 3 | -5.145E-06 | 5.145E-06 | 0. | 8.250E-04 | 4.080E-05 | 0. | 0. | | | |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|-----------|
| 1 0.04434880 | +/-0.99289900 | 0.993889 | -0.044621 |
| 3 0. | | | |
| 4 -0.00606666 | | | |
| 5 -0.09695030 | +/-0.12885100 | 0.161251 | 0.601237 |
| 7 -0.16529400 | +/-0.16340600 | 0.232430 | 0.711156 |
| 9 -0.02015880 | +/-1.36629000 | 1.366440 | 0.014753 |

Complex eigenvectors

| | 1 | 2 | 3 | 4 | 5 |
|----|------------|------------|----------------------|----------------------|----------------------|
| 1 | 0.7276940 | 0.2790240 | 0.7276940-0.2790240 | 0. | 0. |
| 2 | -0.0036818 | -0.0796816 | -0.0036818 0.0796816 | 0. | -4.345E-06 |
| 3 | -0.6176740 | -0.0532091 | -0.6176740 0.0532091 | 0. | 0.0044280 |
| 4 | -9.026E-04 | 1.091E-04 | -9.026E-04-1.091E-04 | 0. | -2.418E-07 |
| 5 | -0.0010144 | 0.0037241 | -0.0010144-0.0037241 | 0. | 9.998E-08 |
| 6 | -6.223E-04 | 5.797E-05 | -6.223E-04 5.797E-05 | 0. | 4.251E-07 |
| 7 | -1.347E-04 | 0.0012224 | -1.347E-04 0.0012224 | 0. | 4.161E-06 |
| 8 | -0.0037888 | 8.524E-04 | -0.0037888 8.524E-04 | 0. | -1.648E-05 |
| 9 | 3.404E-05 | 7.049E-04 | 3.404E-05 7.049E-04 | 1.0000000 | -7.864E-05 |
| 10 | 0.0295949 | -0.0313499 | 0.0295949 0.0313499 | 0. | 0.9999820 |
| | 6 | 7 | 8 | 9 | 10 |
| 1 | -0.0530593 | -0.0647227 | 0.1363450-0.0128142 | 0.1363450 0.0128142 | 0.0323714 0.0450417 |
| 2 | -0.0011007 | -0.0021526 | 0.1815680-0.2026020 | 0.1815680 0.2026020 | -0.9837340 0.1641570 |
| 3 | -0.0625402 | -0.0681249 | 0.0797737 0.2351360 | 0.0797737-0.2351360 | -0.0184290 0.0418609 |
| 4 | 1.350E-04 | 6.781E-05 | -0.0052434-0.0087372 | -0.0052434 0.0087372 | -9.054E-04 0.0089218 |
| 5 | -4.481E-05 | 8.175E-05 | 2.583E-04 1.462E-05 | 2.583E-04-1.462E-05 | 3.348E-04 1.839E-04 |
| 6 | -2.350E-05 | 1.068E-04 | 0.0023637-0.0062162 | 0.0023637 0.0062162 | -8.530E-04 0.0024277 |
| 7 | -0.0010644 | 1.540E-04 | 0.0483657 0.0242066 | 0.0483657-0.0242066 | -0.0074192 0.0010903 |
| 8 | -2.380E-04 | 5.269E-04 | -8.346E-04 7.366E-04 | -8.346E-04-7.366E-04 | -1.382E-04 2.430E-04 |
| 9 | -4.956E-04 | 5.775E-04 | 0.0129854-0.0293699 | 0.0129854 0.0293699 | -0.0019835 7.300E-04 |
| 10 | 0.8779760 | 0.4621610 | 0.7576110-0.5172020 | 0.7576110 0.5172020 | -4.509E-04 0.0015427 |

Table 2 - 39° AOA

lmt39d25kns_ld.dat

Tue Jan 23 09:52:54 1996

1/1

ACSL Runtime Exec Version 11.2.1

Row vector names

V 1

P 2

R 3

PHIO 4

Column vector names

VD 1

PD 2

RD 3

PHID 4

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | -0.0603402 | 164.79000 | -204.20400 | 28.234900 |
| 2 | -0.0039018 | -0.5659690 | 0.1364360 | 0. |
| 3 | -0.0019421 | 0.0130727 | -0.1095990 | 0. |
| 4 | 0. | 1.0000000 | 0.5458610 | 0. |

Row vector names

DAASLN 1

DRASLN 2

DSASLN 3

YJETLN 4

RJETLN 5

DTASLN 6

Column vector names

VD 1

PD 2

RD 3

PHID 4

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0.0259745 | 0.0188197 | 0.0257043 | 0.2265990 | 0.0112126 | -0.0124213 |
| 2 | 0.0175045 | -4.471E-04 | 0.0338921 | 0.0018700 | 0.0245001 | -0.0095864 |
| 3 | -0.0014523 | -0.0019477 | -0.0022077 | -0.0291599 | -0.0017935 | -0.0016755 |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. |

Row vector names

V 1

P 2

R 3

PHIO 4

Column vector names

P 1

R 2

AY 3

AYS 4

BETD 5

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | 0. | 1.0000000 | 0. | 0. |
| 2 | 0. | 0. | 1.0000000 | 0. |
| 3 | -0.0018754 | -0.0167367 | -0.0012326 | 0. |
| 4 | -0.0025004 | 0.0060306 | -0.0476777 | 0. |
| 5 | -2.250E-04 | 0.6272710 | -0.7772970 | 0.1074750 |

Row vector names

DAASLN 1

DRASLN 2

DSASLN 3

YJETLN 4

RJETLN 5

DTASLN 6

Column vector names

P 1

R 2

AY 3

AYS 4

BETD 5

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. |
| 3 | 8.073E-04 | 5.849E-04 | 7.989E-04 | 0.0070429 | 3.485E-04 | -3.861E-04 |
| 4 | -3.000E-04 | -1.504E-04 | -0.0011127 | -0.0042351 | -0.0011094 | -7.303E-04 |
| 5 | 9.887E-05 | 7.164E-05 | 9.784E-05 | 8.625E-04 | 4.268E-05 | -4.728E-05 |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|-----------|
| 1 0.07858980 | +/-0.29785700 | 0.308051 | -0.255120 |
| 3 -0.44654400 | +/-0.43986100 | 0.626801 | 0.712418 |

Complex eigenvectors

| 1 | 2 | 3 | 4 |
|------------------------|----------------------|----------------------|----------------------|
| 1 -0.7584350-0.6510340 | -0.7584350 0.6510340 | -0.7676590 0.6406290 | -0.7676590-0.6406290 |
| 2 0.0016633 0.0058992 | 0.0016633-0.0058992 | 0.0059891 0.0051721 | 0.0059891-0.0051721 |
| 3 -9.529E-04 0.0056202 | -9.529E-04-0.0056202 | -3.649E-05 0.0035395 | -3.649E-05-0.0035395 |
| 4 -0.0271992 0.0110144 | -0.0271992-0.0110144 | -0.0147382-0.0013916 | -0.0147382 0.0013916 |

Table 2 (Contd) - 41° AOA

lmt41d25kns_1d.dat

Tue Jan 23 09:54:20 1996

1/1

ACSL Runtime Exec Version 11.2.1 Dec 14 14:23:49 1995

Row vector names

| | | | | | | | |
|---|---|---|---|---|---|------|---|
| V | 1 | P | 2 | R | 3 | PHIO | 4 |
|---|---|---|---|---|---|------|---|

Column vector names

| | | | | | | | |
|----|---|----|---|----|---|------|---|
| VD | 1 | PD | 2 | RD | 3 | PHID | 4 |
|----|---|----|---|----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | -0.0588401 | 170.86800 | -197.29000 | 28.329500 |
| 2 | -0.0053081 | -0.3097440 | 0.0019751 | 0. |
| 3 | -0.0024682 | 0.0099592 | -0.1186350 | 0. |
| 4 | 0. | 1.0000000 | 0.5378720 | 0. |

Row vector names

| | | | | | | | | | | | |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
| DAASLN | 1 | DRASLN | 2 | DSASLN | 3 | YJETLN | 4 | RJETLN | 5 | DTASLN | 6 |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|

Column vector names

| | | | | | | | |
|----|---|----|---|----|---|------|---|
| VD | 1 | PD | 2 | RD | 3 | PHID | 4 |
|----|---|----|---|----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0.0246645 | 0.0179763 | 0.0256478 | 0.2247690 | 0.0111154 | -0.0139450 |
| 2 | 0.0169132 | -9.149E-04 | 0.0347518 | 0.0019396 | 0.0243988 | -0.0073626 |
| 3 | -0.0015565 | -0.0019330 | -0.0021780 | -0.0289866 | -0.0017824 | -0.0020341 |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. |

Row vector names

| | | | | | | | |
|---|---|---|---|---|---|------|---|
| V | 1 | P | 2 | R | 3 | PHIO | 4 |
|---|---|---|---|---|---|------|---|

Column vector names

| | | | | | | | | | |
|---|---|---|---|----|---|-----|---|------|---|
| P | 1 | R | 2 | AY | 3 | AYS | 4 | BETD | 5 |
|---|---|---|---|----|---|-----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | 0. | 1.0000000 | 0. | 0. |
| 2 | 0. | 0. | 1.0000000 | 0. |
| 3 | -0.0018288 | -0.0209614 | 0.0014786 | 0. |
| 4 | -0.0026121 | -0.0074222 | -0.0442291 | 0. |
| 5 | -2.205E-04 | 0.6534800 | -0.7545270 | 0.1083450 |

Row vector names

| | | | | | | | | | | | |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
| DAASLN | 1 | DRASLN | 2 | DSASLN | 3 | YJETLN | 4 | RJETLN | 5 | DTASLN | 6 |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|

Column vector names

| | | | | | | | | | |
|---|---|---|---|----|---|-----|---|------|---|
| P | 1 | R | 2 | AY | 3 | AYS | 4 | BETD | 5 |
|---|---|---|---|----|---|-----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. |
| 3 | 7.666E-04 | 5.587E-04 | 7.972E-04 | 0.0069861 | 3.455E-04 | -4.334E-04 |
| 4 | -3.623E-04 | -1.564E-04 | -0.0011300 | -0.0042275 | -0.0011050 | -9.853E-04 |
| 5 | 9.433E-05 | 6.875E-05 | 9.809E-05 | 8.596E-04 | 4.251E-05 | -5.333E-05 |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|----------|
| 1 -0.18082000 | +/-0.23320200 | 0.295092 | 0.612758 |
| 3 -0.06278970 | +/-0.58782800 | 0.591172 | 0.106212 |

Complex eigenvectors

| | 1 | 2 | 3 | 4 | |
|---|------------|------------|----------------------|----------------------|----------------------|
| 1 | 0.9850630 | 0.1500150 | 0.9850630-0.1500150 | 0.1184910-0.9927520 | 0.1184910 0.9927520 |
| 2 | -0.0068001 | -0.0186210 | -0.0068001 0.0186210 | -0.0080063 0.0022793 | -0.0080063-0.0022793 |
| 3 | 0.0048926 | -0.0094115 | 0.0048926 0.0094115 | -0.0042290-2.314E-04 | -0.0042290 2.314E-04 |
| 4 | 0.0720809 | 0.0380147 | 0.0720809-0.0380147 | -0.0017774-0.0176795 | -0.0017774 0.0176795 |

Table 2 (Cont'd) - Light Weight Loading

lmt40d25kns_ld_lht.dat

Tue Jan 23 10:47:56 1996

1

ACSL Runtime Exec Version 11.2.1 Dec 15 08:42:48 1995

Row vector names

| | | | | | | | |
|---|---|---|---|---|---|------|---|
| V | 1 | P | 2 | R | 3 | PHIO | 4 |
|---|---|---|---|---|---|------|---|

Column vector names

| | | | | | | | |
|----|---|----|---|----|---|------|---|
| VD | 1 | PD | 2 | RD | 3 | PHID | 4 |
|----|---|----|---|----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | -0.0641090 | 149.64200 | -179.09900 | 27.314300 |
| 2 | -0.0031415 | -0.4671250 | 0.0317138 | 0. |
| 3 | -0.0023206 | 0.0121383 | -0.1064370 | 0. |
| 4 | 0. | 1.0000000 | 0.6220310 | 0. |

Row vector names

| | | | | | | | | | | | |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
| DAASLN | 1 | DRASLN | 2 | DSASLN | 3 | YJETLN | 4 | RJETLN | 5 | DTASLN | 6 |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|

Column vector names

| | | | | | | | |
|----|---|----|---|----|---|------|---|
| VD | 1 | PD | 2 | RD | 3 | PHID | 4 |
|----|---|----|---|----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0.0249645 | 0.0169877 | 0.0298302 | 0.2565140 | 0.0125110 | -0.0112768 |
| 2 | 0.0149630 | -5.480E-04 | 0.0199734 | 0.0024037 | 0.0252693 | -0.0102164 |
| 3 | -0.0012292 | -0.0015864 | -0.0023709 | -0.0290100 | -0.0017333 | -0.0014873 |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. |

Row vector names

| | | | | | | | |
|---|---|---|---|---|---|------|---|
| V | 1 | P | 2 | R | 3 | PHIO | 4 |
|---|---|---|---|---|---|------|---|

Column vector names

| | | | | | | | | | |
|---|---|---|---|----|---|-----|---|------|---|
| P | 1 | R | 2 | AY | 3 | AYS | 4 | BETD | 5 |
|---|---|---|---|----|---|-----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | 0. | 1.0000000 | 0. | 0. |
| 2 | 0. | 0. | 1.0000000 | 0. |
| 3 | -0.0019926 | -0.0195377 | -3.969E-04 | 0. |
| 4 | -0.0028266 | -0.0013983 | -0.0436586 | 0. |
| 5 | -2.678E-04 | 0.6400990 | -0.7660990 | 0.1168380 |

Row vector names

| | | | | | | | | | | | |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
| DAASLN | 1 | DRASLN | 2 | DSASLN | 3 | YJETLN | 4 | RJETLN | 5 | DTASLN | 6 |
|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|

Column vector names

| | | | | | | | | | |
|---|---|---|---|----|---|-----|---|------|---|
| P | 1 | R | 2 | AY | 3 | AYS | 4 | BETD | 5 |
|---|---|---|---|----|---|-----|---|------|---|

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. |
| 3 | 7.759E-04 | 5.280E-04 | 9.272E-04 | 0.0079727 | 3.889E-04 | -3.505E-04 |
| 4 | -1.396E-04 | -8.773E-05 | -5.855E-04 | -0.0036408 | -0.0010209 | -6.513E-04 |
| 5 | 1.068E-04 | 7.267E-05 | 1.276E-04 | 0.0010972 | 5.352E-05 | -4.824E-05 |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|---------------|---------------|-----------|-----------|
| 1 0.14920900 | +/-0.26439700 | 0.303594 | -0.491476 |
| 3 -0.46804400 | +/-0.32968300 | 0.572500 | 0.817545 |

Complex eigenvectors

| 1 | 2 | 3 | 4 |
|------------------------|----------------------|----------------------|----------------------|
| 1 0.6625450 0.7484220 | 0.6625450-0.7484220 | -0.9488420-0.3149580 | -0.9488420 0.3149580 |
| 2 -0.0013254-0.0047140 | -0.0013254 0.0047140 | -0.0031903 0.0086075 | -0.0031903-0.0086075 |
| 3 5.705E-04-0.0064276 | 5.705E-04 0.0064276 | -0.0044169 0.0017168 | -0.0044169-0.0017168 |
| 4 0.0234207-0.0168880 | 0.0234207 0.0168880 | -0.0012530-0.0197894 | -0.0012530 0.0197894 |

Table 2 (Cont'd) - Heavy Weight Loading

lmt40d25kns_1d_hvy.dat

Tue Jan 23 10:49:57 1996

1

ACSL Runtime Exec Version 11.2.1 Dec 15 08:40:53 1995

Row vector names

V 1

P 2

R 3

PHIO 4

Column vector names

VD 1

PD 2

RD 3

PHID 4

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | -0.0582519 | 176.60400 | -211.11700 | 28.739100 |
| 2 | -0.0028897 | -0.4902760 | 0.0414165 | 0. |
| 3 | -0.0023133 | 0.0176245 | -0.1176910 | 0. |
| 4 | 0. | 1.0000000 | 0.5028070 | 0. |

Row vector names

DAASLN 1

DRASLN 2

DSASLN 3

YJETLN 4

RJETLN 5

DTASLN 6

Column vector names

VD 1

PD 2

RD 3

PHID 4

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0.0262404 | 0.0188371 | 0.0247818 | 0.2105430 | 0.0104846 | -0.0124396 |
| 2 | 0.0176267 | -6.358E-04 | 0.0375162 | 0.0014753 | 0.0234000 | -0.0097276 |
| 3 | -0.0017312 | -0.0021096 | -0.0024351 | -0.0290633 | -0.0018376 | -0.0018515 |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. |

Row vector names

V 1

P 2

R 3

PHIO 4

Column vector names

P 1

R 2

AY 3

AYS 4

BETD 5

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|-----------|
| 1 | 0. | 1.0000000 | 0. | 0. |
| 2 | 0. | 0. | 1.0000000 | 0. |
| 3 | -0.0018105 | -0.0177560 | 0.0010020 | 0. |
| 4 | -0.0025922 | 0.0057142 | -0.0452087 | 0. |
| 5 | -2.072E-04 | 0.6407150 | -0.7659270 | 0.1042650 |

Row vector names

DAASLN 1

DRASLN 2

DSASLN 3

YJETLN 4

RJETLN 5

DTASLN 6

Column vector names

P 1

R 2

AY 3

AYS 4

BETD 5

Matrix elements - rows across, columns down

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------------|------------|------------|------------|------------|------------|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. |
| 3 | 8.156E-04 | 5.855E-04 | 7.702E-04 | 0.0065439 | 3.259E-04 | -3.866E-04 |
| 4 | -4.460E-04 | -1.957E-04 | -0.0014392 | -0.0045684 | -0.0011736 | -7.588E-04 |
| 5 | 9.520E-05 | 6.834E-05 | 8.991E-05 | 7.638E-04 | 3.804E-05 | -4.513E-05 |

Complex eigenvalues in ascending order

| REAL | IMAGINARY | FREQUENCY | DAMPING |
|------|-------------|---------------|--------------------|
| 1 | 0.17155200 | +/-0.21894200 | 0.278147 -0.616768 |
| 3 | -0.50466200 | +/-0.35860100 | 0.619094 0.815161 |

Complex eigenvectors

1

2

3

4

| | | | | | | |
|---|------------|------------|------------|------------|------------|------------|
| 1 | -0.3329660 | 0.9425000 | -0.3329660 | -0.9425000 | -0.8097370 | -0.5865330 |
| 2 | 0.0029159 | -0.0033731 | 0.0029159 | 0.0033731 | -0.0049913 | 0.0058211 |
| 3 | 0.0055323 | -0.0035559 | 0.0055323 | 0.0035559 | -0.0043622 | 2.710E-04 |
| 4 | 0.0272395 | 0.0046798 | 0.0272395 | -0.0046798 | 0.0038863 | -0.0145662 |

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